DENSE URBANISM AT THE OLD EDGE:

CONFLICT AND RECONCILIATION OF STREETS AND BUILDINGS

A Dissertation
Presented to
The Academic Faculty

by

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In Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy in the
College of Architecture

Georgia Institute of Technology
August 2009

DENSE URBANISM AT THE OLD EDGE:

CONFLICT AND RECONCILIATION BETWEEN STREETS AND BUILDINGS

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Date Approved: April 27, 2009

ACKNOWLEDGEMENTS

I wish to express my special thanks to all those who have helped me in the research and in the completion of this dissertation.

I am very grateful to my advisor, a true scholar, Dr. John Peponis, for his long-time guidance for every step of my study, and for his comprehensive contribution to developing the arguments and theoretical framework for the dissertation. For the past years, his continuous encouragement has kept me going through all the moments including frustration, doubt, hardship, and final enjoyment. Frankly, this dissertation would not even exist without him. I am sincerely thankful for and appreciative of the opportunity that I could work with him for all these years.

I would like to thank Dr. Sonit Bafna for his constructive contribution to the theoretical framework and his feedback as the research progressed. His comments and criticisms on this dissertation were crucial. He helped me construct and improve the arguments and methods of the dissertation from the very beginning. And in the final stage, his concise advice helped me rethink the work, and improve it.

I would like to acknowledge all my dissertation committee members for their attention, engagement in my research and writing, insightful comments, participation in my defense, and comments that improved my work. Professor Michael Dobbins was Commissioner of the Department of Planning and Development for the City of Atlanta. He brings a unique perspective on anything connected with Atlanta urbanism; more than that he brings a distinctive perspective on the interface between planning and urban design more generally. He provided useful information at the beginning of the study,

thus helping to construct the research methodology. He also commented on the final draft, thus helping to reduce the weakness of my work. I am highly appreciative of Dr. Jean Wineman and Professor Douglas Allen for their agreeing to be committee members and reading the whole work in such a tight time frame, given their own busy schedules. I am even more grateful for their questioning of the method and the results presented in the dissertation, in a manner which helped to clarify the key conclusions in this final draft.

I would like to give my special thanks to Sam Massell, President of Buckhead Coalition; and Kemp Mooney, architect who designed the first three-building community in the Tower Place block. Thanks for their acknowledgeable conversations and valuable narratives of Buckhead development history. I wish to extend my gratitude to Steven Cotting for his proofreading and editorial review. I absolutely understand that reading the whole dissertation word by word is an arduous task, particularly for someone with no specialized knowledge in this field. Not only has he caught many grammatical errors and typos but he has also given me some good suggestions about how to organize the presentation of the argument. I also wish to thank Martin Scoppa for his great help during my study. As an expert in GIS software and cartography, Martin has been extremely helpful in the creation of many of the maps presented in this work.

Finally, I would like to thank my parents for their extreme patience and unconditional love. During all these years, their support ultimately enabled me go through all the difficulties. I would certainly like to express my thankfulness to my best friends: Dr. Weiling He, for her continuous encouragement, and her pushing me to the finish line; Jilong Li, for his great support, and his helping me accomplish a major goal.

Thank you all.

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SUMMARY

In the last few decades, new centers have emerged at the edges of traditional cities and pre-World War II suburbs. As these evolve, do they converge towards the urban forms of traditional cities? This question is explored based on a study of urban areas in the Atlanta Metropolitan Region. Atlanta Downtown, Decatur and Marietta, are compared to the new centers in Buckhead, Cumberland and Perimeter. The evolution of the street network of Buckhead is examined in detail. The morphological history of a particular urban block in Buckhead—the Tower Place block—is documented. Morphological analysis, focusing on street patterns, block shapes and sizes, property boundaries and building footprints, is complemented by *Space Syntax*, focusing on the structure of street networks and connectivity. It is shown that new urban centers tend to grow on very large blocks accessed through major transportation infrastructure, but situated in otherwise sparse and fragmentary street environments. As these centers grow and as the density of land use increases, a secondary private road system is created, to take advantage of development potential and provide access to major building investments. The effective fragmentation of the large blocks suggests a pattern of metric convergence towards an optimum block size. In traditional cities, however, the street network is stable over time and acts as the framework for changes in architecture and land use. In the new centers, the secondary road system serves to access particular private investments without regard to the creation of a public framework of connections. From a syntactic point of view, the new centers are spatially unintelligible, thus substantially diverging from traditional cities, even as they accommodate dense mixed

use developments. The thesis points to the need of developing and using subdivision regulations and zoning classifications in order to better regulate the spatial structure of new urban centers in the future.

CHAPTER 1

INTRODUCTION: THE EMERGENCE OF NEW URBAN FORMS

In recent decades, Americans have made changes in the way they build cities. New cities have been emerging at previous urban fringes and suburban areas. The appearance of the new pattern of urban form was generated by the underlying socio-economic changes in the past century in America, and became a topic of national interest. This raises two essential related questions: will these new cities be convergent towards or divergent from old towns as they grow and mature, and what is the future of American urban development? In order to answer these questions, we need to understand the mechanism for the development of the new urban form. In this study, Conzen's urban morphology descriptive method (Conzen 1960, 2004) is combined with the *Space Syntax* analytical method (Hillier and Hanson 1984; Hillier 1996), to examine the pattern of growth of emerging cities, taking selected areas in the Atlanta Metropolitan Region as a case study.

1.1 New Cities on the Edge and the Decentralized Metropolis

Historically, American cities were created as political jurisdictions and concentrations of social and economic activities. They were mostly built and extended on the gridiron plan. The economic activities, presence of people, and physical properties such as buildings, blocks, and streets, were concentrated on the original kernels (Vance 1964, 72; Reps 1965, 294, 524; Conzen 1960; 1980, 120; Jacobs 1993, 201-268). This created a special form in the urban history—the American downtown. This urban growth pattern showed the strong trend of being highly dense at the initial core, and gradually or

sharply less dense when moving outward (Siksna 1997, 1998; Hillier 1999a; Peponis et al. 2007b).

From the turn of twentieth century, in response to the increasing problems caused by urban development of the inner-city, such as over populated and congested central areas and monotonous cityscapes, new ways of making better cities were proposed. The *Garden City* movement was the most influential one in the United States. The concept was first proposed by Ebenezer Howard and his followers in European cities, and was quickly accepted and implemented by American architects and urban planners (Dal Co 1983, 211; Eisner et al. 1992, 135-139). Dal Co has concluded that there were three reasons for the success of the garden city in America: solving the problem of congestion of inner cities and separating the new urban centers from the old cities; offering larger real-estate markets and attracting more investment; and integrating better residential areas into better planned cities. In summary, the garden city offered another alternative to urban growth (Dal Co 1983, 211). Thus, besides the traditional extension of the gridiron layout, another form of urban development emerged—creating the planned garden suburb with deformed and irregular urban fabric located in the fringe of the existing cities (Southworth and Owens 1993).

The new urban form stimulated a series of new phenomena, such as decentralized urban growth, the territorial diffusion of settlements, the segregation of city functions through zoning, the development of suburbs, the demand for commuting by automobile and the construction of roads (Dal Co 1983, 185; Jackson 1985, 114). Meanwhile, a series of policies speeded this pattern of new form after World War II. First, the Federal Housing Administration (FHA) and Veterans Administration (VA) loan programs were

established. They provided mortgages for over eleven million new homes, and made monthly loan payments less expensive than rent. As a result, a large number of new houses were built at the new frontier beyond the city. Second, the Interstate Highway Act of 1956 was passed. The act authorized the construction of more than 41,000 miles of highway around the country. Ninety percent was paid for by the federal government with an initial cost of $26 billion (Jackson 1985, 205-208, 249-250; Duany et al. 2000, 4-5). These policies made living in the periphery with car commuting a reality.

Residences came first, and commerce and job markets followed. The prospective customers' relocation made the shops and retail move out accordingly. The emerging residential areas thus became the concentrations of economic activities, and large numbers of commercial buildings were constructed (Leinberger and Lockwood 1986; Garreau 1991; Duany et al. 2000). One type of building—the large shopping mall—played a critical role and was considered an important stimulant in the process of shaping new cities (Leinberger 1989; Garreau 1991, 6-7; Lang 2003, 49, 99). Large buildings worked as stimuli of economic activity, including shopping malls, retail stores and plazas, business parks, and business skyscrapers. This certainly created large numbers of jobs in the new cities, which attracted more people to live there. Consequently, the cycles of reciprocal attraction between new residential areas and new retail and business centers allowed suburban areas function as cities, and turn into the economic hubs of the new metropolis, even though their forms tend to be very different from those of traditional urban kernels.

The phenomenon of the new cities in previous suburban areas became one of the most discussed topics in urban development, and some scholars exclaimed that America

has become a "suburban nation" (Sharpe and Wallach 1994; Duany et al. 2000). As a matter of fact, a few theorists in the 1960s had already foreseen it. Lynch predicted that future urban development would emerge at the periphery with low density (Lynch 1961, 106-109). Vance thought that tomorrow's city would spread outward away from the traditional towns (Vance 1964, 72). After the 1970s, as the American metropolis' decentralization reached high proportions, the suburban urbanization gained national interest (Sharpe and Wallach 1994, 4). Many new neologisms were created to describe this phenomenon, and most of them appeared in the late 1980s. More than 200 terms were listed in the 1992 Columbia University conference on the new suburbs (Columbia University 1992). Lang provided a good literature review and summary for the terms (Lang 2003, 31-35). Table 1.1 is based on his summary and includes the terms, the years they were created, and their authors. Although there were major disagreements in naming this pattern of new urban form among the scholars and theorists (Lewis 1995, 61), it is clear that most of the terms emphasized two essential elements of the new metropolis—the location of previous suburban area and the functionality of the city. For the first aspect, these terms often have the prefix or suffix "suburban," "sub," "village," "edge," or "fringe." For the second aspect, they have "city," "town," "urban," "metro," or "core." Among them, the most influential is Garreau's "edge city." In his renowned book *Edge Cities: Life on the New Frontier*, Garreau introduced the main concept of "edge city" and set up certain criteria for being an "edge city." Moreover, he listed examples of edge cities or emerging or even possible edge cities in many metropolitan areas (Garreau 1991). In this thesis, this term is applied to the new cities evolving at the previous urban fringe.

Table 1.1 Term List of New Urban Form

Term	Year	Author
Anticity	1985	Louv, Richard
Cities a la carte	1990	Fishman, Robert
Concentrated decentralization	1985	Daniels, Peter W.
Contrified city	1984	Doherty, James C.
Disurb	1987	Baldassare, Mark, and C. Katz
Edge city	1991	Garreau, Joel
Edgeless city	2000	Lang, Robert
Exopolis	1997	Soja,Edward
Galactic city	1983	Lewis, Pierce F.
Major diversified center	1983	Baerwald, Thomas
	1983	Huth, Mary Jo.
Megacenter	1985	Orski, Kenneth C.
	1986	Cervero, Robert
Megacounty	1987	Church, George
Metropolitan-level core	1986	Hartshorn, Truman A., and Peter Muller
Metropolitan suburb	1986	Baldassare, Mark and Katz, C.
Metrotown	1988	Romanos, Michael C., Carla Chifos, and Tony Fenner
Mini-city	1972	Breckenfeld, Gurney
	1976	Muller, Peter
Mini-downtown	1986	Cervero, Robert
Multicentered net	1961	Lynch, Kevin
Net of mixed beads	1990	Pivo, Gary
New downtown	1978	Baerwald, Thomas
Outer city	1976	Muller, Peter
	1987	Stevens, William K.
Outtown	1987	Goldberger, Paul
Penturbia	1987	Lessinger, Jack
Regional city	2000	Calthorpe, Peter and William Fulton
Regional town center	1985	Hutton, Thomas A., and H. Craig Davis
Ruburbia	1988	Hughes, James W., and George Sternlieb
Secondary downtown	1996	Bourchert, James
Servurb	1988	Malin, Steve R.
Slurbs	1973	Huxtable, Ada Louise
Spillover city	1972	Packard, Vance
Spread city	1960	Regional Plan Association
Stealth city	1992	Knox, Paul
Subcenter	1996	Gordon, Peter, and Harry W. Richardson
Suburban business center	1986	Hartshorn, Truman C., and Peter Muller

Table 1.1 (continued)

Term	Year	Author
Suburban downtown	1982	Baerwald, Thomas
	1989	Hartshorn, Truman C., and Peter Muller
Suburban employment center	1989	Cervero, Robert
	1998	Freestone, Robert, and Peter Murphy
Suburban freeway corridor	1978	Baerwald, Thomas
Suburban growth corridor	1986	Hughes, James W., and George Sternlieb
Suburban nucleation	1985	Erickson, Rodney A., and Marylynn Gentry
Technoburb	1987	Fishman, Robert
The new heartland	1986	Herbers, John
Uptown	1991	Garreau, Joel
Urban core	1990	Leinberger, Christopher B.
Urban galaxy	1961	Lynch, Kevin
Urban realm	1964	Vance, James E., Jr.
Urban village	1984	Leinberger, Christopher B.
	1986	Leinberger, Christopher B., and Charles Lockwood

(Source: Lang 2003, 31-35)

Under the pressure of social and economic changes, the new cities emerging on previous urban edges led to the emergence of the polycentric metropolis form. All the cities, including traditional towns that used to be independent and separated from each other, and new cities, were becoming more and more absorbed into the urban fabric of the larger metropolitan area. The traditional view of the monocentric model for the urban growth of metropolis was not working any more (Burgess 1925). Lynch's conceptual patterns for future metropolis and Vance's urban realms theory both indicated the emergence of new metropolitan form with multiple centers that were loosely connected with relative low-density surroundings (Lynch 1961, 106-111; Vance 1964, 72).

With the advent of freeways, a paradox gradually emerged, whereby the dispersed centers, or indeed the residential areas enjoyed convenient and speedy links to their

distant counterparts, creating what Weber called a metropolitan urban "realm", which challenged the traditional idea of a pattern of urban places. However, the disruption of local road connections sometimes caused by the freeways, as well as the preference for enclave development and cul-de-sacs has led to a condition where global connectivity not only functioned to give rise to a new sense of an urban realm, but also to disrupt the traditional fabric of linkages between adjoining neighborhoods (Webber 1964, 79-153). As Castells pointed out, the development of these loosely interrelated urban settlements in a metropolitan context showed the distinctive feature of being locally disconnected but globally connected. They shaped a new metropolitan form—mega cities. Their functions were linked but the land use patterns were discontinuous (Castells 1996). This new polycentric spatial form generated by the new socio-economic conditions creates a path for urban sustainability and the direction of future urban development (Jenks et al. 2008).

1.2 Would New Forms of Urbanization be Convergent Towards or Divergent from Traditional Ones?

Responding to the trend of new urban development, most scholars agreed that the new metropolises represented the future life of the American cities, and their emergence and growth would weaken the social-economic importance of the previous downtown areas. Duany thought it became "the standard North American pattern of growth" (Duany et al. 2000, 4). Garreau stated that edge cities represented the suburban future and American urban development's future (Garreau 1991, 14-15).

Most scholars, however, not in agreement whether new edge cities would be convergent towards or divergent from traditional towns after urban growth. Some expected that edge cities would grow up and become more like old downtowns some day

(Langdon 1990; Barnett 1992; Bruegmann 1995; Lewis 1995; Leinberger 1996). Over time the emerging edge cities could grow denser, attract more businesses and developments, gain population, provide mass transit service, and eventually become the true concentrations in metropolitan areas and take over the place of previous downtowns. From this perspective, the new forms of urbanization will become convergent towards traditional downtowns.

However, other scholars, notably Vance, claimed that new cities differed in both physical scale and functional structure from traditional downtowns (Vance 1964, 68). The difference would persist during or even after the urban evolution. There are three major reasons to make them believe that new urban areas would be divergent from old towns. First, edge cities have curvilinear and sparse street layouts and are located near the interstate highway system, which were initially designed for speedy automobiles and a low-cost and open-space suburbia (Garreau 1991; Scheer and Petkov 1998). By increasing the density in urban growth, the winding street network sets up the different restrictive framework from the orderly gridiron layout in most American downtowns. The new urban areas cannot be expected to develop similarly to traditional downtowns, at least in the primordial public space framework, and the subsequent urban fabric, including land subdivision and building developments.

Second, new urban areas display the discontinuity of their fabric, especially land use patterns—several blocks with business, retail and entertainment focal points are mixed with large amounts of low-density residential surroundings. This feature is caused by the essential properties of edge cities: residence and business are in close proximity but at the same time they are often zoned strongly apart, and separated by the fragmented

nature of the street network. This is in contract to most traditional downtown areas (Leinberger and Lockwood 1986).

Third, new urban areas show a strong trend of inequality in density—high centralization on the business hub relative to their suburban surroundings, most of which are residential areas (Garreau 1991; Leinberger and Lockwood 1986). The development of edge cities was realized by selectively adding more density in population and commerce to the central cores. This indicates that there was more developable land, lower floor area ratios (FARs), and lower building densities in edge cities than those in traditional downtowns (Brown and Hickok 1990).

The land use discontinuity and density inequality are the basic features of new urbanism (Castells 1996, 402-404), and will persist as long as the concurrence of business and residence in edge cities exists in urban growth. Thus, based on the above physical features, a different urban form is expected in new cities than in traditional American downtowns.

1.3 Morphogenesis: The Physical Shaping of Urban Form

The term "morphology" comes from the Greek words *morphe* and *logic*, referring to the method of scientific study focusing on form and structure. Urban morphology is then the method of studying urban space by focusing on its form and structure. Conzen was the first scholar to bring the urban morphology method to the study of formative processes and the geographical characteristics of townscape. Furthermore, he defined the concept of "morphogenesis" as the study of morphological processes in the townscape over long periods of time (Conzen 1960; 1977; 1985; 1986; 2004). This involves studying the historical change in the form and structure of an urban area, emphasizing

incremental changes in form and latent elements, and the interaction between physical form and the underlying constraining factors.

Central to this method is Conzen's belief that the town plan, including physical street frame and plot pattern, land use pattern, and building fabric, were three constituent forms of townscapes. They served as an object of systematic investigation in urban morphology (Conzen 1960; 1977; 1985; 1986; 2004). Influenced by Conzen's theory and methodology, later scholars and theorists examined urban growth by stratifying urban form elements into different layers such as streets, land subdivisions and buildings, traced their transformations in history, studied the interaction between these elements and underlying constraints, and, finally, tried to understand the mechanism of urban morphogenesis (Moudon 1986, 1987; Southworth and Owens 1993; Jo 1998; Whitehand 2001; Southworth and Ben-Joseph 2003; Panerai et al. 2004, 158-166; Whitehand and Gu 2007).

From this literature, the constituent elements of urban morphogenesis can be summarized as follows:

1. Streets. They constitute the main framework for development, acting as the boundaries of the urban block, and the distribution of land, within which property lines have been negotiated. They determine access to individual plots (Krier 2003, 326), as well as the character and quality of the urban form (Southworth and Owens 1993). Streets are usually defined in the public domain and for public use, and considered as regulatory framework for urban development (Anderson 1986; Rykwert 1986; Moudon 1987). They contribute to the development's identity by providing

known addresses in the urban context. Finally, they suggest different hierarchies of importance, regarding frontages and also regarding access.

2. Land Subdivisions. They are the units of land ownership and development. They are usually considered as the regulatory framework for the urban fabric and are controlled by land ordinance and zoning within the jurisdiction. Given the huge size of the urban block, land subdivisions have to be delineated such that all parts of the block have means of access to the public framework of streets. They also have to be of sufficient size to accommodate the scale of development contemplated by the developers. Rossi argued the formation of large land lots would result in totally different programs for city development (Rossi 1982, 139). Moudon stated that a small land lot would produce more predictable building forms (Moudon 1986). Jo thought that land subdivision is the critical mechanism to form the urban space in the modern city. A small lot has limited and predictable options in resulting forms while a larger parcel provides less predictability and more options for the building shape and position on the land (Jo 1998). Owned by private landlords and regulated by zoning and ordinance, land subdivision is where public and private realm initiatives take place and interact. It is also in the intermediate level where streets and buildings interface and reconcile with each other.
3. Buildings. They are the substance of investment and development and they determine the quality of the site in terms of program, spatial organization, and visual form. They are interfaced with streets and positioned within the parcels. The land subdivisions within the block framed by streets provide the possibilities for architectural design decisions. A series of questions arise considering the building

with other constraining factors: where is the main entrance, how is the front determined, how is the building accessed, and how is service access accommodated? (Whitehand and Gu 2007) Above all, the most interesting question, given the nature of the development, is: how does each building take into account preceding ones and how does it enable or constrain subsequent building planning, design and construction?

These elements of urban morphology are shaped within an overall framework that I will call regulatory law. Regulatory law refers to all regulations, codes, documents, and overlays related to urban planning and design, such as land ordinance, zoning and subdivision laws, street standards, building codes, site design codes, parking requirements, open space requirements, setbacks, floor area ratios (FAR), fire codes, etc. Regulatory laws are the means of choice for directing the shape of urban form and future development by policy makers and urban planners (Conzen 1986; Calthorpe 1993; Duany et al. 2000; Ben-Joseph 2005). The policy assumption is that appropriate management of regulatory law can constrain natural developmental forces, motivated by profit, in order to produce desired urban form without directly defining a precise configuration of urban elements. In order for such an assumption to work, however, we need to better understand the process by the three elements of urban form come to take specific shapes.

Several models of such morphogenetic process exist. In one, the primary determinants are land-ownership patterns. Jo in his study of Atlanta has shown that large lots can supply more potentialities in resulting building forms and positions (Jo 1998), a point discussed much more generally by Rossi, building upon extensive studies of

cadastral maps by Italian and French geographers (Rossi 1982). Others have proposed that street networks are the primary generators of form. Martin worked at the newly formed Center for Land Use and Built Form Studies at Cambridge, challenged received opinions about high-rise development by showing that changes in street network configuration in Manhattan could produce extremely high densities and satisfy light and air requirements without recourse to very high rise buildings (Martin 1972).

It is this latter model that has been dominant in the morphogenetic studies of growth and urbanization of suburban areas. Moudon has shown that large deep blocks are intensified by inserting alleys and subdividing the block interior in suburban areas (Moudon 1986). Siksna in a comparative study of American and Australian cities, proposed that larger urban blocks tend to evolve through a process of block fragmentation and the creation of a finer mesh of streets inside (Siksna 1997; 1998). The result of these processes is that sparse suburban areas, if subject to growth, begin to acquire the characteristics of the more traditional urban areas—increased density of built-up land, decreased block-sizes, and increased number of road intersections. The strong proposition, then, is that as contemporary cities develop they tend to converge towards the traditional.

The interesting point to note in this process of convergence is that the internal roads that emerge are often in the private domain; they have not been planned in advance and are not part of the public street system. Conzen referred to them as a "pseudo-street system"—a pattern of secondary communication lines developing spontaneously as the result of building repletion (Conzen 1960). The emerging pattern of internal roads is a

form of hybrid urbanism, a framework of social spaces which arises with or after the development and acts as a sort of "organic substitute" for a framework of public streets.

Part of the purpose of this thesis is to document such a change in a specific case, particularly to understand how such private streets arise as part of specific building oriented investment decisions, and how they express and represent the consensus between different land owners as to how to organize the site.

In addition to this work, however, the more consequential claim of this thesis is that the convergence of physical parameters (density of streets and built-up land) is not enough to speak of the outcome as convergent towards the traditional model. As it grows, the street network also creates a structure that determines, in practice, how the urban area becomes intelligible to those that live, work, or visit. And, in that respect, the increased densification by the gradual construction of private internal streets does not create the same urban structure as in a traditional street. This point will be discussed in the following section.

1.4 *Space Syntax*: Street Network as an Intelligible Structure

Hillier and Hanson have used the word "morphology" to describe not only the comparative study of observable forms but also the search for the underlying principles and mathematical constraints that govern the generation and reproduction of urban forms. In the 1980s, Hillier and his colleagues developed the theory of "*Space Syntax*" to explore the urban space and growth. The key premise here is that the intelligibility, and therefore the basic functionality, of an urban area is primarily a product of the street network configuration, hence the term "syntax" (Hillier 1996). Distinguishing between visible order (as in the orthogonal grid-network of an urban area such as Manhattan) and

structure, *Space Syntax* researchers have argued that traditional cities are not just densely connected and heavily built-up, but also that their street-networks are highly structured. The structure allows their inhabitants to cognitively map the city by sorting out central from non-central streets and understand the inter-relationships between the central streets. The structure also creates important social epiphenomena, in that some streets, mostly the central ones, end up with the most people and others with relatively very few (Hillier et al. 1993). This, in turn, allows the inhabitants to navigate the streets in planned but indeterminate ways, seeking out others or sheltering from them. In appropriate cases, it allows for ceremonial or symbolic areas to come into play, not just on the basis of visual treatment of buildings, but also on the basis of structural relationships between streets and buildings (Hillier 1989).

Space Syntax theory provides a specific analytical methodology to describe the structure of street networks by mapping it onto a network of undifferentiated straight-line segments called the axial map. The mapping method is user intensive and laborious. But recently, Peponis and his group have adjusted the method so that it can directly utilize publicly available data in large GIS (Geographic Information System) databases. They developed new measures that capture the relational-topological properties of spatial organization traditionally emphasized by *Space Syntax* while at the same time dealing explicitly with metric properties as well (Peponis et al. 2008).

In the following sections, key concepts related to *Space Syntax* methodology are defined. They will be used systematically throughout the dissertation:

1. Axial map. The axial map is created to represent the real spatial system. Here, axial lines are used to stand for streets or secondary internal roads at certain conditions. In

this way, the real spatial system is represented as an abstract configurational structure, and their interconnections are only generated by the internal structure. Based on the syntactic maps and quantitative tables generated by a computational program, the nature of urban space, urban evolution, and the underlying morphological constraints are analyzed.

2. Integration and Depth. "Integration" describes the centrality of a given axial line, relative to all other lines in the system. The centrality is calculated by measuring the distance between lines in terms of depth, or changes of direction, between lines. A line intersecting another line is at a depth of one; depth between any two lines in a map is the smallest number of intersections crossed in order to move from one of the lines to another; integration of a line then is a relativised value of the average depth of a line from all other lines in the map. Usually, we calculate two different integration values of each line in the map to show their different properties in the system. The first one is the local property, which only counts the lines within a certain number of direction changes or depth (three is the most often used, that is, Real_Int. R(3)) from the line. The second one is the global property, which calculates all the other lines starting from one line within the system (Real_Int. R(n)). After line analysis, different colors are assigned to the lines shown in the axial map to indicate a different degree of integration in the system—the redder, the more integrated; the bluer, the more segregated, either locally or globally. In this way, the lines that are syntactically important, either locally or globally, can be determined directly. It is expected that these integrated lines in axial maps can suggest which streets could possibly be physically important in the real world. Moreover, by applying the

concept of “integration core,” which accounts for ten percent of the most integrated lines, the most integrated areas of the system can be identified. Then, it is anticipated that those areas hold greater potential for public functional use, such as business or commerce. In other words, those areas are more likely to be functional spaces, concentrating commercial facilities and public buildings (Hillier 1996; Peponis et al. 2007b). From this perspective, different integration values generated by spatial structure itself may indicate configuration inequalities, which could be expected to result in attraction inequalities in the real urban space. This could be helpful in our thinking about the selections of land use patterns.

3. Accessibility. For any line in the axial map, we can capture other lines within a certain number of linear steps or direction changes to formulate the capture map showing the “catchment area.” Through this, we can know the accessibility of one line in the system, either physically (Hillier 1999) or visually (Peponis et al. 1998). In the axial maps, the larger the catchment area, the easier the accessibility of the space should be. So it is quite reasonable for us to expect that the space with the larger catchment area is more likely to have space concentrating functional use in the real urban space, because it is easier for people to arrive, concentrate and communicate. This could be the guideline for some design decision making.
4. Intelligibility. The concept of “intelligibility” is defined as the relationship between local (such as connectivity, integration radius three Real_Int. R(3)) and global properties (such as integration radius n Real_Int. R(n)), which can indicate how far you can see the whole system from the local position; or in the sense of spatial navigation, how far you can navigate your way within the system; or to what extent,

local spatial characteristics can predict the global location of the particular space you are in. We usually use the correlation between local and global properties to show the degree of intelligibility of the spatial system. If the correlation is strong, the spatial system is intelligible and subjects can easily navigate within the system. If the correlation is weak, the spatial system is unintelligible and it is difficult for subjects to locate themselves in the system or they have difficulty finding their way around. In an intelligible space, we can expect efficient and quick movement. Similarly, the concept also can help us to understand which kind of urban space is well-functioning and can result in easy navigation and efficient movement, and which is not, thus, providing the framework for improvement.

5. Natural Movement. Movement is a critical factor and an observable parameter in urban space (Jacobs 1961; Hillier 1996). In his theory of "natural movement", Hillier thought movement would be distributed according to the relational properties of the street system. The main proposition of "natural movement" is that spatial structure should be the primary generator of movement in urban grids. In graphic form, the distribution of colors of axial lines in axial maps will predict the distribution of movement in the spatial area, either pedestrian or vehicular. A series of studies have corroborated the hypothesis that spatial configuration correlates powerfully with observed movement, either for pedestrians (Hillier et al. 1983; 1987; 1993; Peponis et al. 1989; 1997; Read 1999) or for vehicles (Peponis et al. 1997; Penn et al. 1998). Furthermore, Hillier and his colleagues proposed the concept of "movement economy." The correlation between movement and street system indicates attraction of the commercial use along syntactically integrated lines. Then, the commercial use

can be an attractor to movement, so more movement will happen there, which continues to increase the density of commercial uses. This spiral process of the multiple relationships between structure, movement, land use, and density is called the "movement economy," which Hillier thinks has a critical influence over the land use pattern and urban evolution (Hiller 1996, 111-137). In a well-functioning city, land use pattern and urban evolution should reflect the movement economy. Pursuant to movement economy theory, we can anticipate that the syntactic integrated spaces would attract more movement and increase the density of functional uses, especially commerce, which can consequently intensify the local grid condition and produce a more efficient movement pattern. This is not only the general guideline for the selection of commercial building locations such as shops, but also the key principle of land use pattern and urban evolution.

1.5 Outline of the Thesis: Methodology and Comparative Case Study of Urban Morphogenesis

This thesis brings two methodologies together for the purpose of studying urban morphogenesis pattern and its underlying growth mechanism in new edge cities, and understanding the new pattern is convergent towards or divergent from the traditional urban development model. On the one hand, urban morphology as represented by Conzen, Moudon, Southworth, Whitehand and Jo deals with the relationship between streets and blocks, land subdivisions, and building forms. On the other hand, *Space Syntax* deals with the properties of the street network and its underlying spatial structure, and helps to explain the growth process with more fine-grained analysis and with an eye to properties such as intelligibility, distribution of centralities and shape of integration

core. In order to understand the interplay between the realities on the ground, best described by urban morphology of a traditional kind, and structural principles, best dealt with by *Space Syntax*, two methodologies are combined in this work.

This thesis is developed through comparative case study on three scales:

(1) A comparison of the different morphological patterns of Atlanta's new edge cities and traditional towns;

(2) An exploration of the urban morphogenesis of one edge city—Buckhead for fifty years;

(3) An evaluation of the interaction between urban form and latent factors in one typical block—the Tower Place block in Buckhead during the same period.

To understand the convergence or divergence between traditional and new cities, two different types of cities in the Atlanta region are defined. The first type of city is the traditional city—Downtown Atlanta, Decatur, and Marietta (the jurisdictions of Fulton, DeKalb, and Cobb Counties). The second type of city is the new emerging edge city centered on large shopping malls and located to take advantage of the highway system—Buckhead (the Lenox Square-Phipps Plaza area), Perimeter (the Perimeter Mall area) and Cumberland (the Cumberland Mall area), as defined by Garreau (Garreau 1991, 141).

In Chapter 2, through comparative studies based on *Space Syntax* theory and method, two patterns of cities are found to have important metric and syntactic divergence. The new edge cities are characterized by lower integration and intelligibility, larger block sizes, especially adjacent to the most integrated lines, and linearly more fragmented streets. By looking carefully at the growth of new cities, we observe a process of evolution of a secondary internal circulation system which effectively divides

the large blocks in a manner consistent with previous findings by Siksna (Siksna 1997; 1998). The secondary circulation system mostly emerging in private land creates a denser syntax of movement and seems to set the foundation for a potential emergence of a denser pattern of spatial layout. This analysis shows that the secondary process takes two forms, depending on the size and location of the building footprint on the properties concerned. Sometimes, the secondary circulation creates "shortcuts" which become integrated lines and contribute to the syntactic intelligibility and integration of the area as a whole. At other times, the secondary circulation "ripples off" the perimeter of large buildings, remains fragmented, and fails to enhance the syntactic integration or intelligibility of the larger area, while still providing access to the premises under consideration. It is concluded that there is a latent spatial dynamic, transcending the clear distinction between public and private circulation systems, which turns the new cities into more integrated and accessible systems with smaller blocks and denser spatial fabrics.

In order to explore the process of urban growth in new edge cities and understand the mechanism of urban morphogenesis, Chapter 3 develops the case study of Buckhead. Combining traditional morphology and *Space Syntax* methodologies, Buckhead's urban evolution process is traced for fifty years starting from the 1950s, focusing on the changes in street structure and land use pattern. During this period, the previous suburban area has developed into a new edge city. Axial maps of the defined area are reconstructed for every decade from 1950 to 2005 based on available data and resources. In this way, we can detect the incremental changes of street framework, and observe the metric or syntactic consequences of these changes during urban growth, which may indicate the latent urban fabric transformation. While exploring the evolutionary process

in the study area within Buckhead, spatial dynamics were found to occur in the urban fabrics and the syntactic patterns caused by reconfiguring the framework, especially after the introduction of highways into the spatial system. Additionally, we find spatial conflicts happening in this area. Different land use patterns of commercial districts and residential areas coexist in the area. The whole urban evolution is the process of the encroaching of business territory and the receding of residential districts, and shows the conflicts between different land uses, public regulations, and private interests. In summary, the spatial dynamics and spatial conflicts occurring in Buckhead's development indicate the mechanism of urban growth, and the interactions of different morphological constraints and factors in urban morphogenesis.

In order to study the interaction between urban form, land development, and the underlying constraining factors, in Chapter 4, one sample block was selected—the Tower Place block—in the Buckhead area. The Tower Place block has experienced significant, and more recently, accelerated growth. Originally, the block was only accessible from its perimeter. Currently, the block is traversed by multiple circulation spaces. Thus, the history of "Tower Place" is a history of increasing urban density and growth associated with an intensification of the internal road grid (Hillier, 1999) or, equivalently, a fragmentation of a large block into smaller ones (Siksna, 1997; 1998). In Chapter 4, the traditional urban morphology method is used to track down the urban development process of this study area in detail by looking at eight time snapshots between 1951 and 2008. The area is examined from four essential elements of urban form in both public and private realms—streets, land subdivisions, buildings, and the internal circulation system. In the process, the previous extroverted block and residential land lots with street

frontage changed into introverted. Land lots and the buildings inside the block without street frontage necessitated the internal roads to provide access. The typical deep residential parcel transformed into a larger and more compact lot which supplied more options for architectural decisions and less predictable building form. All elements of the urban fabric were constructed under the negotiation and reconciliation among constraining factors and mutual interactions. This development was underpinned by two fundamental paradoxes in the public-private in-between realm—the internal circulation system, which is in the private domain but available for public use (limited, at least for residents within the block). First, a number of different property owners and developers have to negotiate a framework for their decisions, in the absence of a pre-existing street system that would provide access to land in the interior of the Tower Place block. Second, as the surrounding area of Buckhead grew, and traffic congestion ensued, property owners and developers sought to prevent through-traffic from crossing the block. As a consequence, the internal spatial morphology of the block oscillates between two different principles—creating an effective circulation movement to attract more patrons, but avoiding the cut-through traffic flooding the block. The actual private road network on the ground potentially allows for several different traversing paths. The effective use of the road pattern, as enforced through control gates and barriers, works as a distribution tree-network, leading in and out of the site but discouraging traversal. Here, the effective morphology and spatial layout is in conflict with the private interests. One way to reconcile it is what the land owners in the Tower Place block currently agree to do—the barriers are scheduled to come down during the busier times of the day but are

not operational at quieter times. Thus, the effective morphology changes during the day to balance with the private investment interests.

In conclusion, therefore, the history of the Tower Place block reflects the following process: great increase in density, leading to a new metropolitan center, and taking advantage of global connectivity through freeways; and internal circuits leading to a local intensification of the street network, albeit through private roads. This mode of urbanism, which is driven from large investments both private and public, is in contrast to traditional urbanism generated according to the structure of the street grid. The contrast has a fundamental consequence. As the internal road system develops to accommodate large investments away from the traditional periphery of the Tower Place block, there is no intelligible public spatial order that connects the pieces to each other and to their immediate surroundings. Rather, we are dealing with a continuously negotiated pattern of accessibility. More than that, since the internal investments are not linked structurally to the immediate surroundings, there is no evolutionary pressure for the structure of the internal roads to develop an intelligible structure. Simultaneously, channeling movement though a minimum of internal connectors and external streets continues to reproduce traffic congestion commensurate with each successive scale of development density.

CHAPTER 2

NEW AND TRADITIONAL URBAN CENTERS IN THE METROPOLITAN REGION OF ATLANTA

This chapter presents a comparison of six urban centers in the metropolitan region of Atlanta, three that originated as traditional cities and became absorbed in the metropolitan fabric, and three that grew more recently around major road intersections and large shopping malls at the edge of traditional cities. Applying *Space Syntax* and traditional methods of morphological analysis, the metric and syntactic properties of the six study areas are compared. One of the major findings to be presented is the development of a secondary functional circulation system which Conzen has called a "pseudo-street system" (Conzen 1960) within the very large blocks associated with the new urban centers. This finding is consistent with previous findings by Siksna (Siksna 1997; 1998). The secondary circulation system creates a denser circulation network, and sets the foundation for the potential emergence of a denser pattern of space use. As large blocks fragment into smaller sub-blocks, the grain of the urban fabric of new urban centers gets to resemble more the scale of traditional cities. However, the new centers, or edge cities, illustrate a different social and organizational process whereby the secondary circulation system lies on private land and changes in conjunction with changes in zoning, patterns of land subdivision and large real estate investments. In addition, the syntactic properties of the new urban centers remain distinct even when we take into account the secondary internal circulation system. Thus, the convergence between traditional and edge cities regarding the metric properties of the urban fabric (block size

and density of intersections) is coupled to divergence from the point of view of *Space Syntax* and also from the point of view of the underlying logic of urban evolution.

2.1 Discontinuity and Evolution in the Formation of Cities: The Case of Atlanta

It has been remarked in the literature (Rutheiser 1996) that "Atlanta" can refer to alternative and overlapping geographies. The currently defined "Atlanta-Sandy Springs-Marietta" Federal Metropolitan Statistical Area (MSA) includes 28 counties and covers 8,481 square miles with estimated population of 5,278,904 in 2007 (Data Source: United States Census Bureau 2007a; see Figure 2.1 for the location in Georgia and Figure 2.2 for the boundary). The "Atlanta Regional Commission" (ARC), as defined by membership in the regional planning and intergovernmental coordination agency, covers 10 counties and 64 cities spread over 2,981 square miles, with an estimated 2007 population of 4,029,400 (Data source: ARC 2007; see Figure 2.2 for the location in the MSA and Figure 2.3 for the boundary). The "City of Atlanta" covers 132.4 square miles and has an estimated 2007 population of 519,145 (Data Source: United States Census Bureau 2007b; see Figure 2.3 for the location in the ARC and the boundary). For the purposes of this thesis "Atlanta" is defined as the geographic area of greatest population density, inside the Atlanta Region, covering roughly 485 square miles, with 50% of the region's population. This encompasses the area inside the 62.5 miles long loop of Interstate I-285, as well as additional areas to the North, East, and South of the loop.

How did the six study areas to be analyzed in this chapter get chosen? As discussed in Chapter 1, today's American metropolitan areas have become decentralized, with multiple nuclei. Authors such as Garreau and Koolhaas pointed to the fact that the Atlanta area has multiple urban cores instead of one (Garreau 1991; O.M.A. et al. 1995).

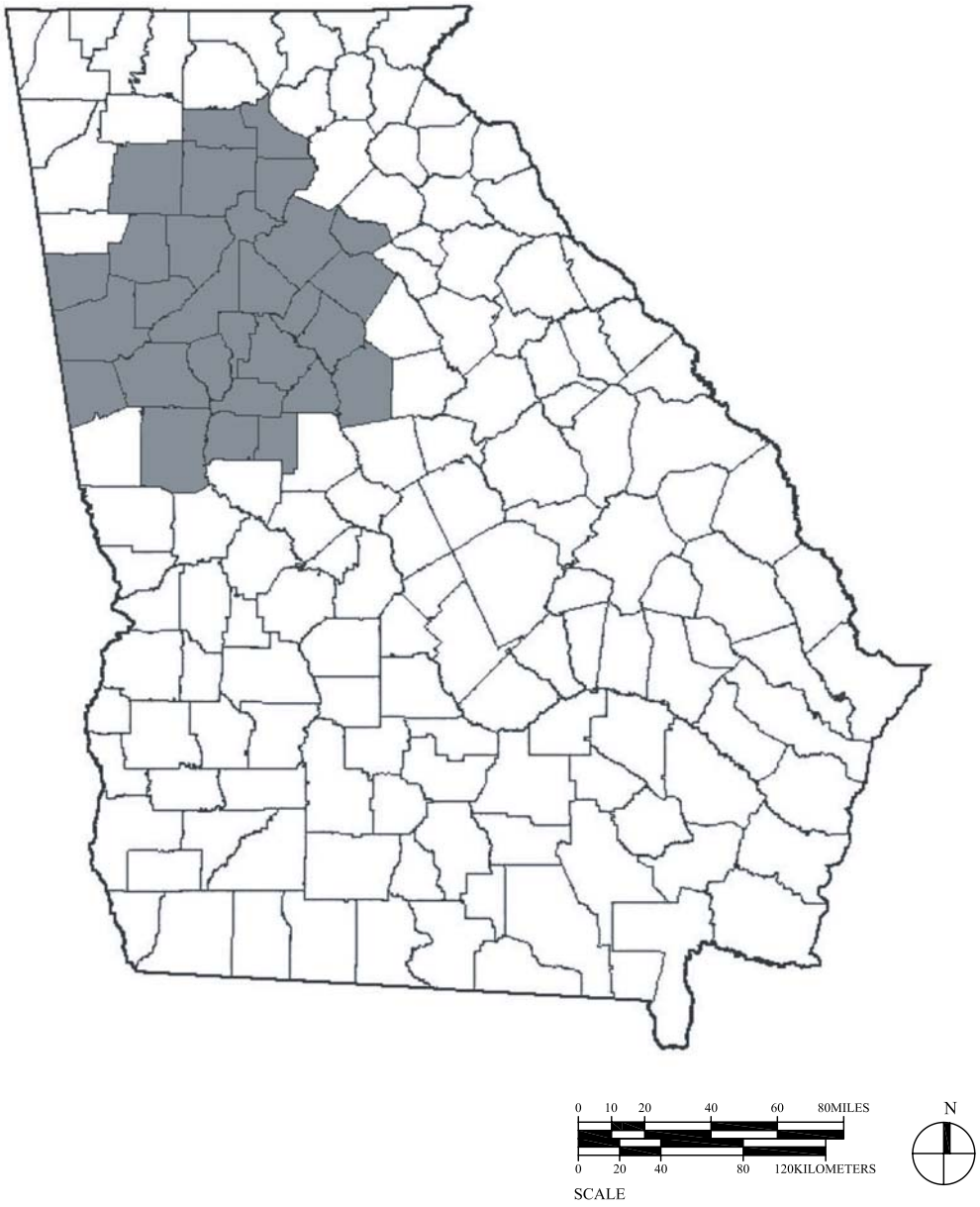

Figure 2.1 Map of Georgia State and Atlanta-Sandy Spring-Marietta Metropolitan Statistical Area (MSA, Grey Area)

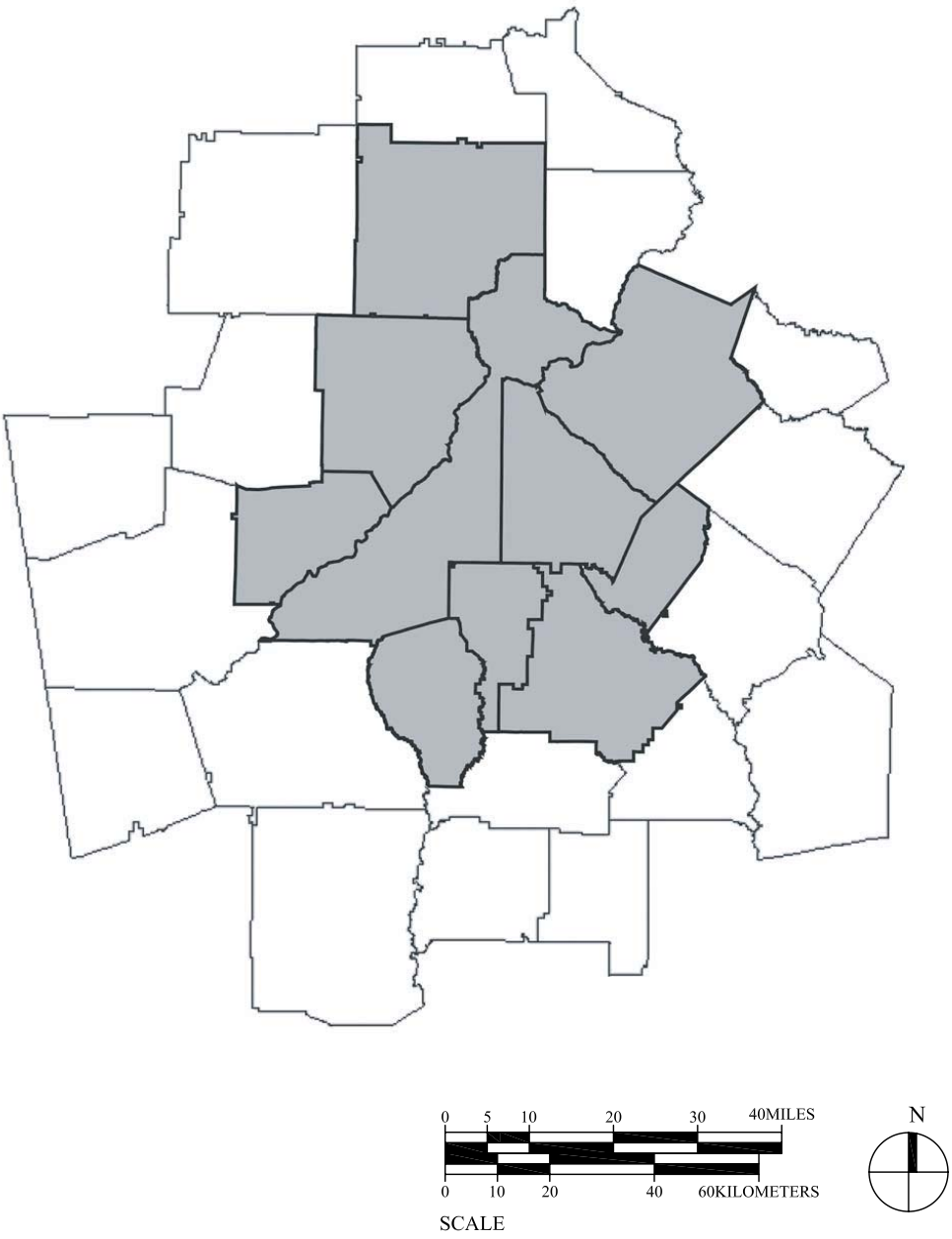

Figure 2.2 Map of Atlanta-Sandy Spring-Marietta Metropolitan Statistical Area (MSA) and Atlanta Regional Commission (ARC, Grey Area)

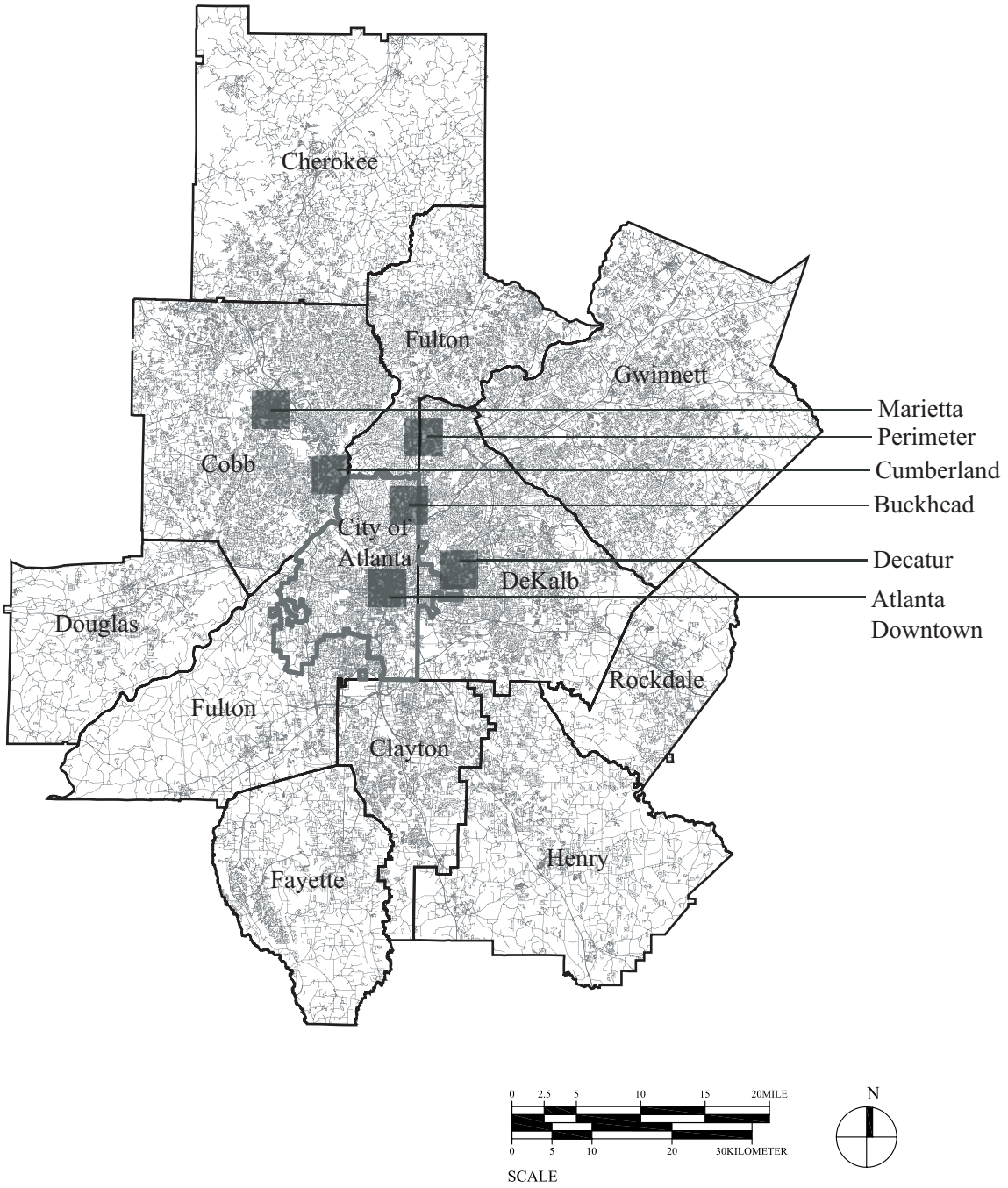

Figure 2.3 Map of Atlanta Regional Commission (ARC), the City of Atlanta, and the Locations of Six Study Areas (Grey Areas), 2004

Many of the cores grew in the periphery, on land which was at the edge rather than in the middle of densely developed areas. In recognition of emerging edge cities, the idea of centrality has to be dissociated from overt geometrical interpretations. This certainly resonates well with the *Space Syntax* literature where syntactic centrality, based on inequalities of access, has been distinguished from geometric centrality, based on 2-D shape, right from the outset (Hillier et al. 1983). We define "cities" as local concentrations of development and activity whose vibrancy, from the point of view of economy, culture, and the presence of people, depends upon their ability to serve the population of a larger surrounding area. Often cities are as large as the region and beyond—at least as far as some of the land uses are concerned. This is an intuitive and heuristic definition corresponding to our everyday use and exploration of the city. It has the added advantage of not requiring the cities under consideration to be recognized as a jurisdiction city of any kind. They can be jurisdiction cities, or they can be emergent cities of activity that correspond to no jurisdiction and have no recognition other than the one afforded by the manner in which residents and visitors make sense of the city, talk about it, or orient their movement in it.

There are at least two distinct kinds of cities which form a vivid contrast from the point of view of everyday experience. On the one hand, there are the traditional cities which have been developed with the growing metropolitan fabric. On the other hand, new cities arise around major shopping malls, located so as to take advantage of the older system of major streets and the newer freeway infrastructure. This gives rise to a simple but essential question: are the urban layouts associated with the two kinds of cities different and, if so, in what ways?

The first part of this analysis identifies sharp and consistent differences between old and new urban centers regarding the size and shape of urban blocks as well as the syntax of the surrounding streets. In the second part of this analysis, a secondary process of morphological evolution taking place inside the large urban blocks associated with the new cities is recognized. Blocks break up into distinct sub-blocks surrounded by internal circulation. A secondary circulation system arises which intersects with public streets to provide denser links not only within but between larger blocks. As a result, some parts of the new cities begin to resemble the spatial fabric of older cities, despite the significantly lower floor area ratios (FAR). The findings are consistent with those reported by Siksna. Cities which start with larger urban blocks, such as those of Australia, or Toronto in Canada, tend to evolve through a process of block fragmentation and the creation of a finer mesh of streets. Blocks between 38,750 square feet (3,600 square meters or 0.9 acres) and 215,278 square feet (20,000 square meters or 4.9 acres) are more suitable for urban growth and development. Street meshing with intersection intervals between 262 feet (80 meters) and 361 feet (110 meters) are more suitable for pedestrian and vehicular circulation, with even finer meshes found where pedestrian activity is more intense (Siksna 1997; 1998). In addition to confirming, at least in part, Siksna's findings for the case of Atlanta, syntactic analytic techniques are used to make critical discriminations between configurationally different evolutionary paths. Theoretical implications and questions arising from this work will be discussed in the concluding section.

2.2 A Comparative Sample of Six Cities in Atlanta

The three examples of traditional cities considered are the cities of Atlanta (Atlanta Downtown, Fulton County), Decatur (DeKalb County), and Marietta (Cobb

County) (see Figure 2.3 for their locations within the Atlanta area). The city of Atlanta (Atlanta Downtown) was first planned in 1836 as a terminal for the rail lines and incorporated in 1847. The city of Decatur was established before the city of Atlanta and was incorporated in 1823. The city of Marietta became the Cobb County seat in 1834 and was incorporated in 1852. The morphologies of the three historic towns originated in the first half of the 19th century (Garrett 1954).

Garreau defined an edge city as having these characteristics: more than five million square feet (460,000 square meters) of office space; more than 600,000 square feet (55,000 square meters) of retail space or a mall of equivalent size; greater population during the workday; and perceived as one place but not like a "city" thirty years ago (Garreau 1991, 6-7). The three examples of new edge cities circumscribed in this thesis are Buckhead, Cumberland, and Perimeter; all recognized by Garreau (Garreau 1991, 426-427) (see Figure 2.3 for their locations). Lenox Square in Buckhead, the oldest mall in the areas under study opened in 1959. Perimeter Mall opened in 1971 and expanded in 2000. Cumberland Mall opened in 1973, expanded in 1997 and was renovated in 2003. Today, Lenox Square receives 2,900,000 visits per month, has 230 stores, and a mall area of 1,450,000 square feet (135,000 square meters). Phipps Plaza, across Peachtree Street from Lenox Square, receives 1,129,000 visits per month, has 110 stores, and an area of 821,000 square feet (76,300 square meters). Perimeter Mall has an area of 1,560,000 square feet (145,000 square meters), 225 stores, and receives 926,000 visits per month. Cumberland Mall has an area of 1,040,000 square feet (97,000 square meters). The growth around these malls represents more recent socio-economic changes and generates the emergence of new urbanism.

The following conventions were used to delimit the areas under study. Each city was studied within a surrounding area of 3 x 3 miles (9 square miles or 23.31 square kilometers). In the cases of traditional towns, the study areas were centered on original kernels. Decatur and Marietta are centered on the old courthouses. Atlanta Downtown is centered on the site of the original railway station at the intersection of Peachtree, Decatur, and Marietta Streets. For the new edge cities, the study areas were centered upon the mid points of the street lines attached to the entrances of the major shopping malls. Axial maps were created based on the available street maps.[1] Computer generated axial maps of the six cities are presented, showing the pattern of integration, in both local value Real_Int. R(3) (see Figure 2.4 to Figure 2.9) and global value Real_Int. R(n) (see Figure 2.10 to Figure 2.15).

2.3 Initial Observations Suggesting Differences Between Traditional and Edge Cities

While Atlanta Downtown (Figure 2.4 and Figure 2.10) is covered by a pattern of intersecting grids, Decatur (Figure 2.5 and Figure 2.11) and Marietta (Figure 2.6 and Figure 2.12) are characterized by a clear morphological polarity between a grid in the middle and a pattern of curvilinear streets, forming clusters of continuous connections. This reflects an equally clear polarization between the mixed pattern of land use, near the middle of the geographical area, and the dominance of residential uses around it.

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[1] The main reference is the Atlanta Metropolitan Aero Atlas in 2004, by Aero Surveys of Georgia, Inc. located at the Georgia Institute of Technology Main Library. The maps cover six counties—Clayton, DeKalb, Fulton, Cobb, Douglas, and Gwinnett, and mainly issue the street and highway system in those counties. Other references include Fulton County GIS Website http://wms.co.fulton.ga.us/, and Google Earth Map http://earth.google.com.

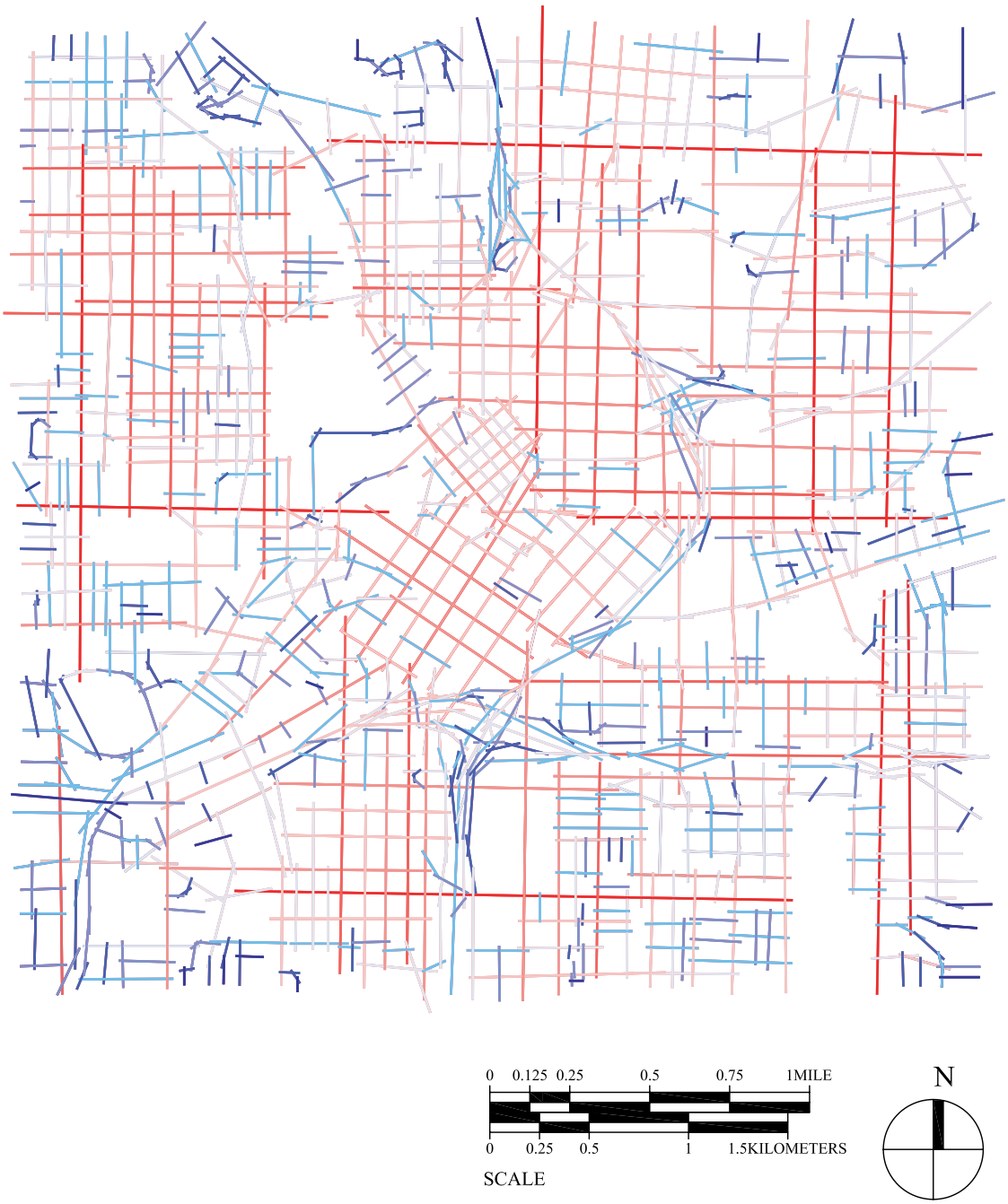

Figure 2.4 Local Integration Map of Atlanta Downtown, 2004

Figure 2.5 Local Integration Map of Decatur, 2004

Figure 2.6 Local Integration Map of Marietta, 2004

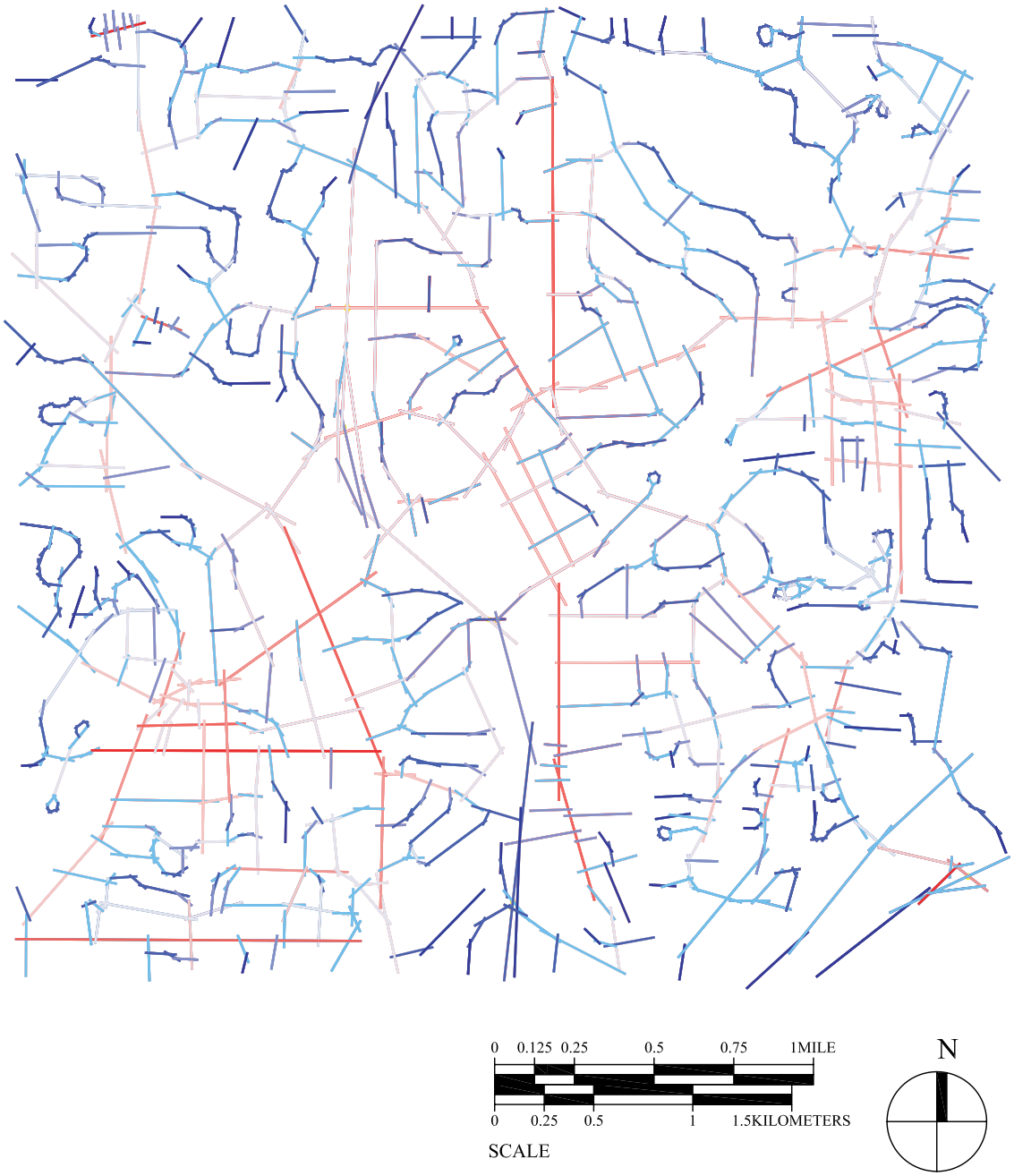

Figure 2.7 Local Integration Map of Buckhead, 2004

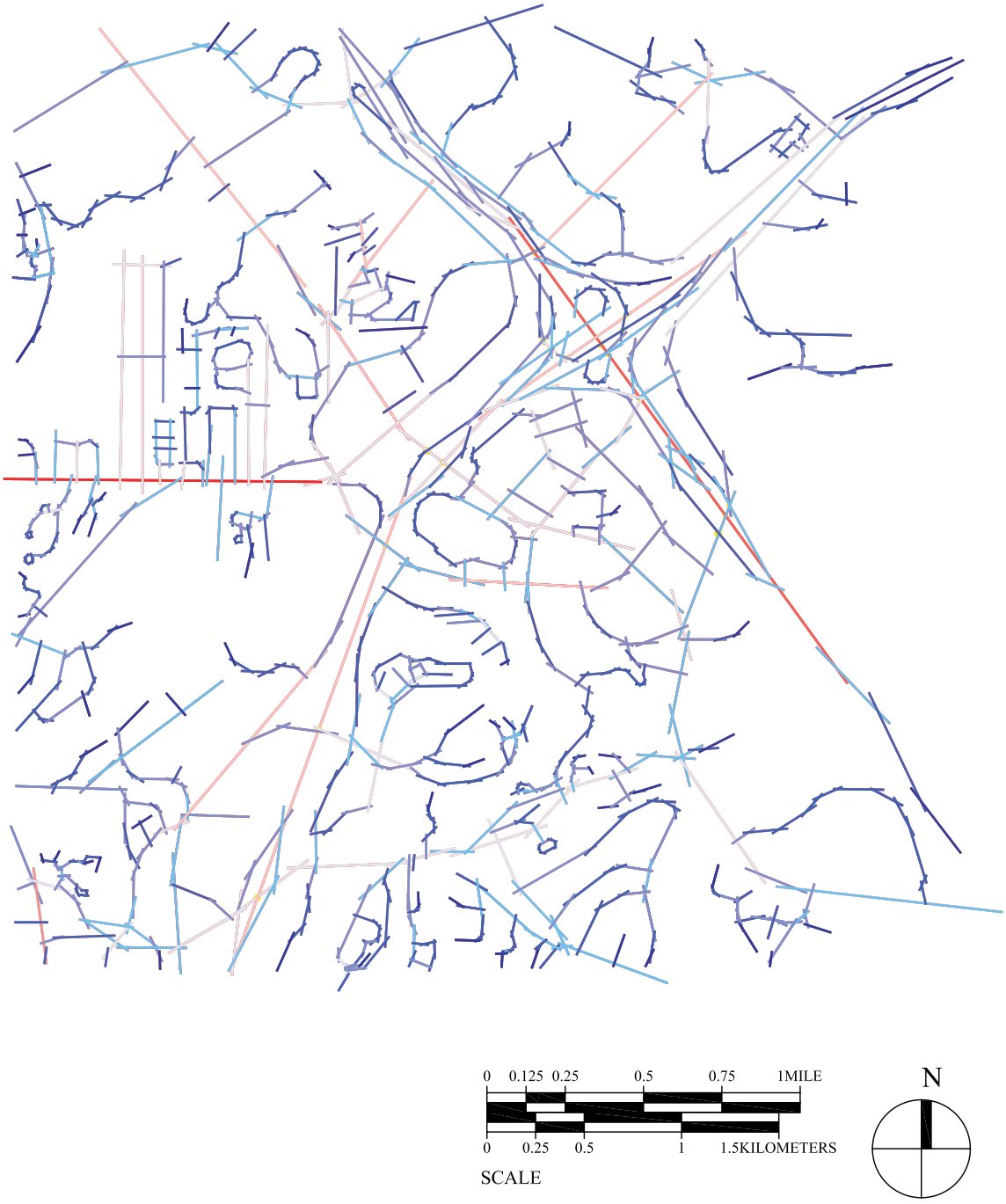

Figure 2.8 Local Integration Map of Cumberland, 2004

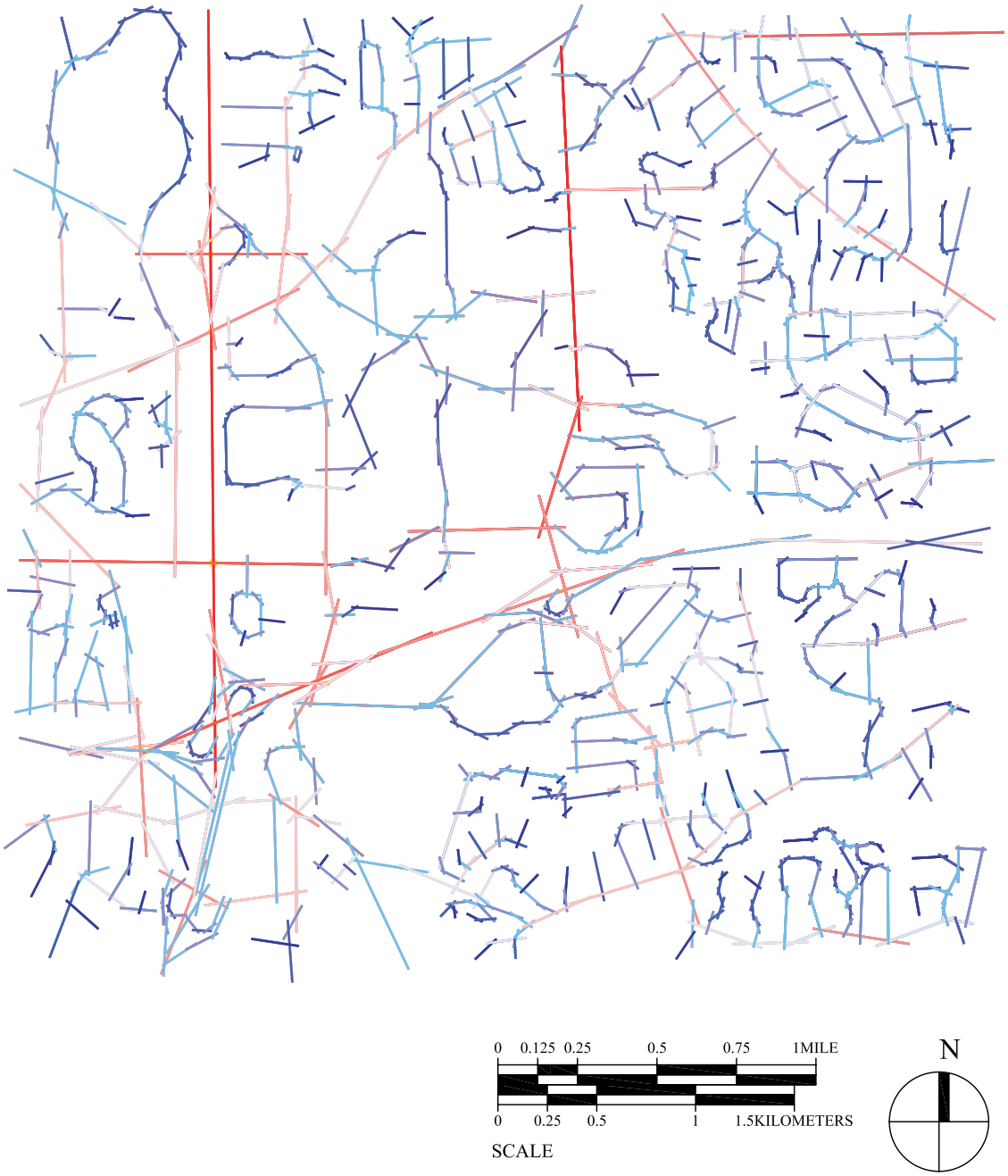

Figure 2.9 Local Integration Map of Perimeter, 2004

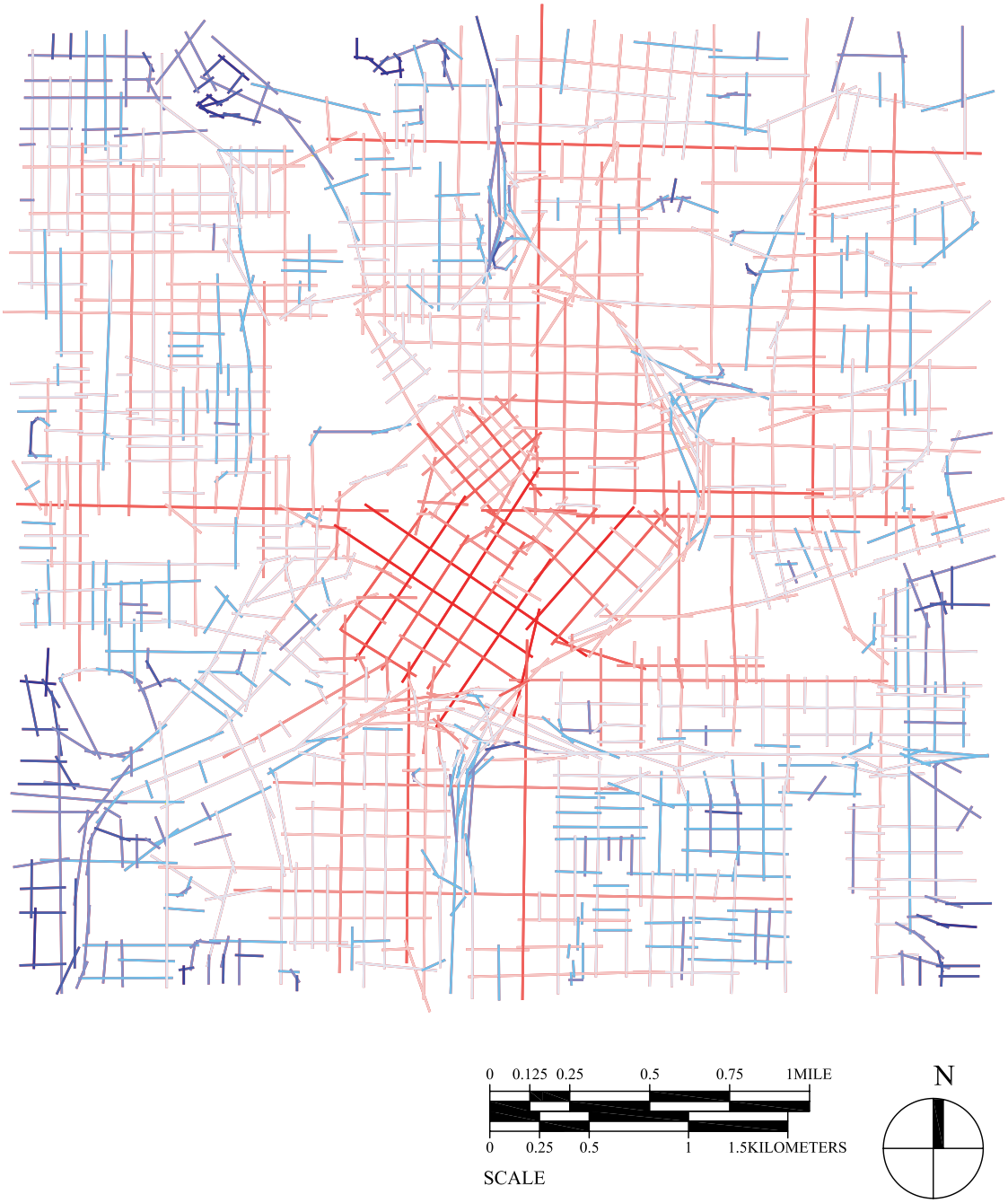

Figure 2.10 Global Integration Map of Atlanta Downtown, 2004

Figure 2.11 Global Integration Map of Decatur, 2004

Figure 2.12 Global Integration Map of Marietta, 2004

Figure 2.13 Global Integration Map of Buckhead, 2004

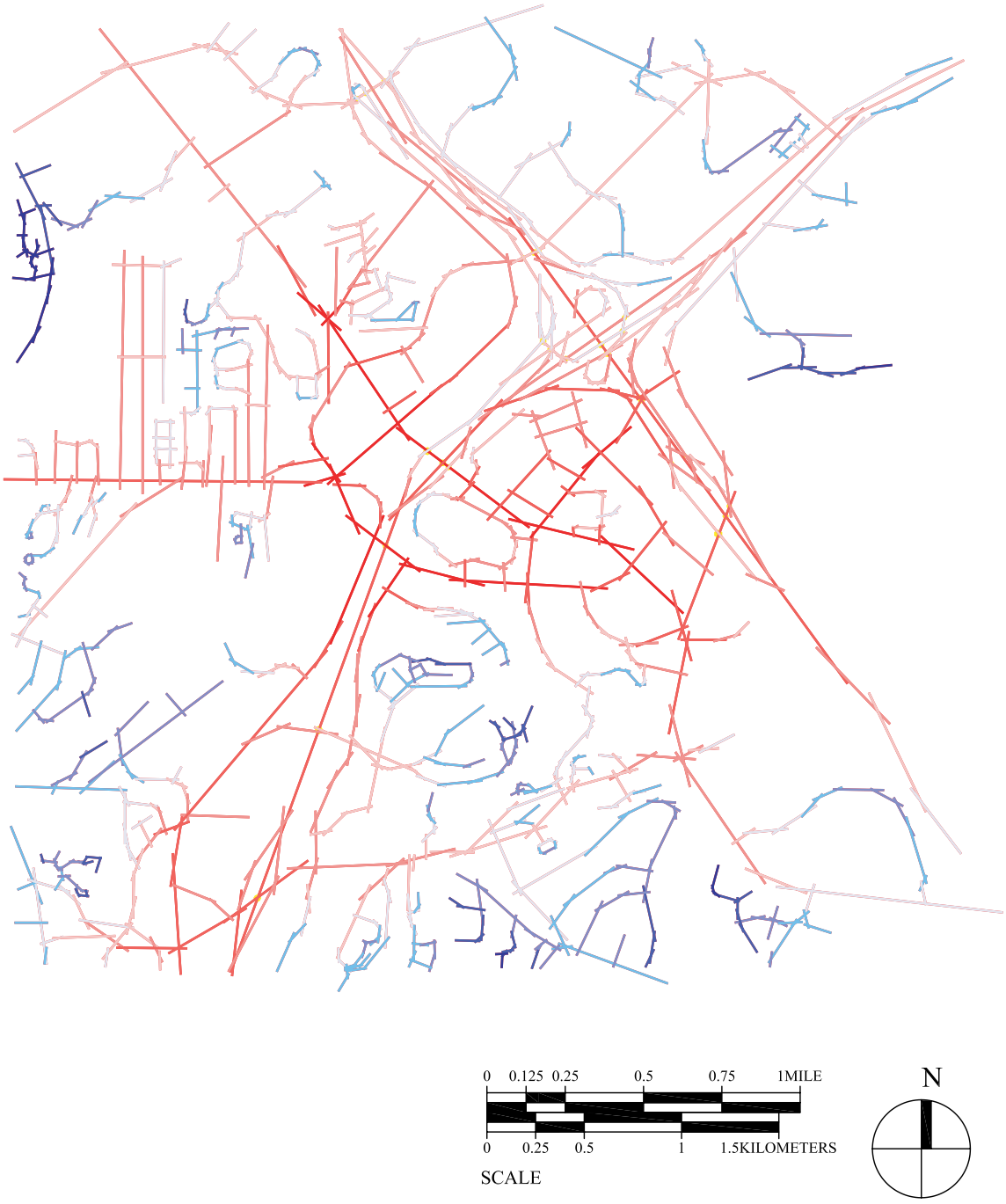

Figure 2.14 Global Integration Map of Cumberland, 2004

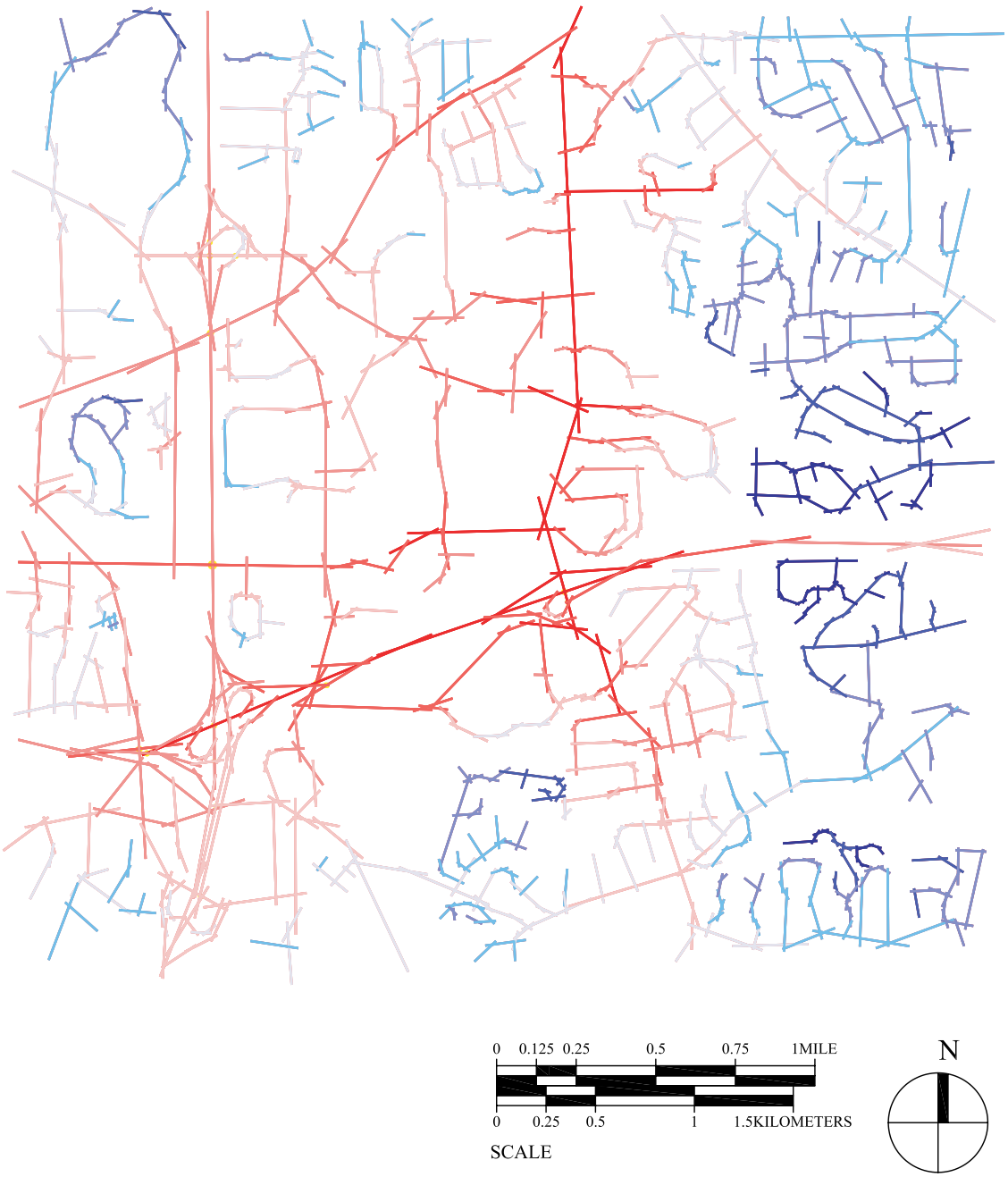

Figure 2.15 Global Integration Map of Perimeter, 2004

The conditions in the new edge cities are more varied. In Buckhead (Figure 2.7 and Figure 2.13), there is a polarity between a more connected and highly deformed grid in the middle, with a more fragmented and curvilinear pattern of residential areas around. Cumberland (Figure 2.8 and Figure 2.14) is located near the intersection of freeways I-285 and I-75, which causes a much more radical discontinuity in the local urban fabric. This is clearly a case where "global connection" is coupled with "local disconnection," a characteristic that Castells has identified as typical of new megacities (Castells 1996, 404). Perimeter (Figure 2.9 and Figure 2.15) is located in an area bordering on I-285 to the south and traversed by old roads which provide scaffolding for movement. The vicinity of the mall block is structured as a sparse grid, with fragmented residential areas in the surroundings, especially to the east. Some commonalities found in new edge cities are different from the characteristics in the traditional cities. They usually are linked to freeway nodes but not closely related to local urban fabrics. They have more irregular and sparsely intersected street networks. Their streets are made up of shorter lines. They comprise larger urban blocks and more open lands. And finally, their grounds are less densely occupied by building footprints. These preliminary observations suggest differences in the spatial and syntactic properties between the new and old cities. In the next sections we discuss the metric and syntactic characteristics of the sample more systematically.

2.4 Metric Properties: What Do Larger Blocks with Shorter Lines Mean?

A block is a shaped sub-section of a city or town, defined as the island of land surrounded by streets. It is the fundamental unit of an urban area and the basic constituent of spatial configuration. Its size determines the spatial grain of the urban

fabric. Moudon and Siksna have used block size as one of the major parameters in studying the transformation of urban form in the process of growth (Moudon 1986; Siksna 1997; 1998). The initial impression from the axial maps shows the essential difference in the block density between the two groups of cities under study. Old cities have denser street layouts, more closely spaced street intersections, and smaller urban blocks while new cities have sparser street layouts, greater distances between intersections, and larger urban blocks. As shown in Table 2.1, on average, there are less than 1/4 the number of blocks in the three edge cities compared to the traditional ones with the same 3 x 3 miles boundary (134 compared with 544). Block sizes are considerably larger in the edge cities: 46.35 acres (18.76 hectares) as compared to 13.00 acres (5.26 hectares). The average block size in new cities is almost twice as big as that in old ones. If we think of a block as a square with the same area, their size would be 1420 x 1420 feet (430 x 430 meters) compared to old cities' 750 x 750 feet (230 x 230

Table 2.1 Metric Properties of the Six Study Areas

	Number of Lines	Number of Blocks	Block Size (acres)	Block Size (hectares)	Line Length (feet)	Line Length (meters)
Traditional Towns						
Atlanta Downtown	976	931	6.19	2.50	1,340	409
Decatur	1,132	354	16.27	6.58	796	243
Marietta	985	348	16.55	6.70	826	251
Average	1,031	544	13.00	5.26	987	301
Edge Cities						
Buckhead	1,083	193	29.84	12.08	709	216
Cumberland	911	104	55.38	22.41	728	222
Perimeter	1,044	107	53.83	21.78	711	217
Average	1,013	134	46.35	18.76	717	219

meters). Of course, not all edge cities are equal. For example, among the edge cities, Buckhead has the smallest block size (29.84 acres or 12.08 hectares), but even this is almost double the size of the blocks in Marietta (16.55 acres or 6.70 hectares), which has the largest block size of the sample of old cities.

The numbers of lines on the syntactic maps, however, are almost equal (about 1,000 axial lines for each 3 x 3 miles study area) for the old and new cities, suggesting a more fragmented axial layout in the latter. Quite obviously, if all cities were arranged on gridiron systems, then, for equivalent areas, we would expect larger blocks to be associated with fewer lines. The average line length is 27% shorter in the new cities (717 feet or 219 meters) than in the old towns (987 feet or 301 meters) implying a more fragmented axial layout. Furthermore, the incident angles of lines surrounding the shopping malls are often quite wide, thus implying a principle of curvilinear continuity. In densely built environments, shorter line lengths would imply a lesser range of visual awareness. In the sparser environments under consideration, especially in the edge cities, visibility often extends in two dimensions over parking lots or residential front yards. Thus, axial fragmentation, especially when combined with gradual direction changes, does not necessarily lead to a concomitant reduction of visual awareness or a sense of movement disorientation. On the contrary, it can also lead to an almost cinematic sense of shifting panoramic views, depending on the distribution of visual boundaries. This will be discussed further below.

2.5 Syntactic Properties: Local Disconnection and Global Connection

The color distribution in the maps shows the common dynamics that all central focal points are inclined to be globally integrated. In global integration maps, the reddest

lines are more likely to be around focal hubs while in local integration maps, the reddest lines appear dispersed randomly within the system. So, there is a convergent dynamic which associates global integration with hubs of intense commercial land uses in the old or new cities. However, the hubs not only globally but also locally integrated in the old cities while in the new ones, we see a pattern of global integration dissociated from the pattern of local integration. The difference implies that in old cities the relationship between local and global scales of integration is gradual and continuous while in new cities it becomes disjointed. In terms of everyday experience, this means that as one reaches the centers of old cities one also becomes aware of their quieter residential parts, while in new cities a visitor to the centers of commercial activity gains no intuition of the spatial organization of surrounding residential neighborhoods. Old cities are continuously differentiated. New cities bring together distinct patches without forming a continuous order of spatial integration.

Analyzing the numerical table associated with each axial map of the six study areas, we conclude that the new cities are globally and locally less integrated (globally: 0.488 compared to 0.938; locally: 1.504 compared to 2.057) as well as less connected (2.600 compared to 3.576) than the old cities, as shown in Table 2.2. The differences are considerable and consistent. In addition, the new cities are more fragmentary. More particularly, both the correlation between Connectivity and Integration, and the correlation between Integration radius 3 and Integration are significantly lower for the new cities, 0.462 and 0.346 compared to 0.648 and 0.445. By contrast, the new areas have a higher correlation of Integration radius 3 and Connectivity, 0.916 compared with 0.859 in old ones. This suggests that new areas are locally more coherent and intelligible

Table 2.2 Syntactic Properties of the Six Study Areas

	Real_ Int. R(3)	Real_ Int. R(n)	Connec-tivity	Correlation of Real_Int. R(3) and Connectivity	Correlation of Real_Int. R(n) and Connectivity	Correlation of Real_Int. R(3) and Real_Int. R(n)
Traditional Towns						
Atlanta Downtown	2.628	1.365	4.680	0.839	0.537	0.726
Decatur	1.773	0.699	3.002	0.856	0.382	0.583
Marietta	1.771	0.751	3.046	0.881	0.466	0.635
Average	2.057	0.938	3.576	0.859	0.462	0.648
Edge Cities						
Buckhead	1.583	0.515	2.718	0.923	0.348	0.447
Cumberland	1.490	0.530	2.566	0.886	0.370	0.506
Perimeter	1.438	0.420	2.517	0.939	0.320	0.382
Average	1.504	0.488	2.600	0.916	0.346	0.445

(Note: All correlations are significant at 0.001 level (2-tailed).)

than they are globally. These are the syntactic corollaries of the prevailing mode of fragmentation.

Fragmentation and low connectivity lead to a pattern of dissociation between center-hub and the surrounding area which can best be captured by drawing two-step capture maps. Starting from the lines associated with the central hubs (courthouse, railway station or shopping mall) all the other lines that can be reached within two syntactic steps are drawn, and the highlighted two-step catchment areas are shown in Figure 2.16 to Figure 21. In the cases of Atlanta and Marietta, the two-step capture maps cover a larger proportion of the total 9 square miles surroundings. The proportion is slightly decreased in Decatur. However, it is significantly reduced in the three edge cities. The capture map shows the accessibility of one space to the surroundings within

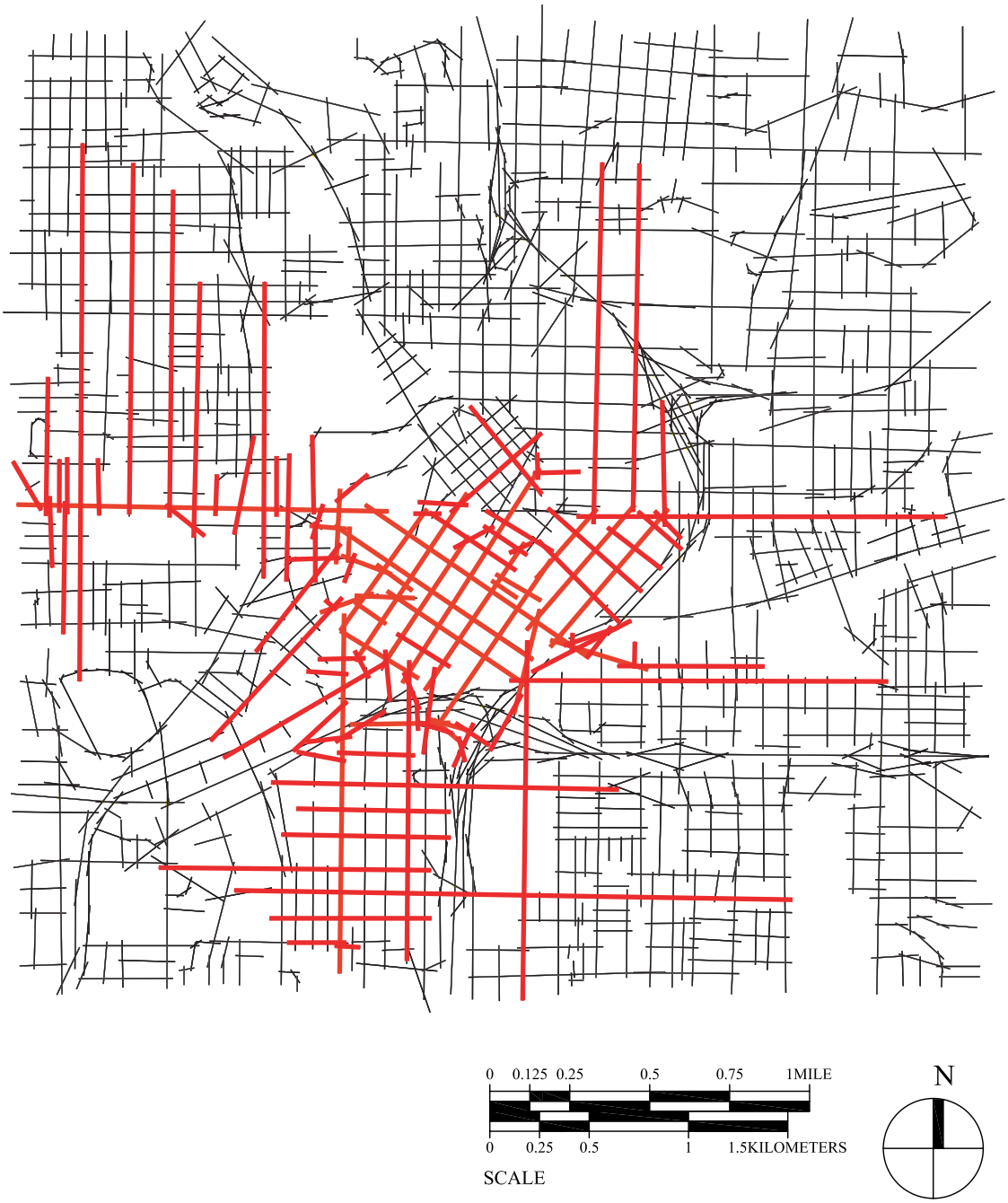

Figure 2.16 Two-Step Capture Map of Atlanta Downtown, 2004

Figure 2.17 Two-Step Capture Map of Decatur, 2004

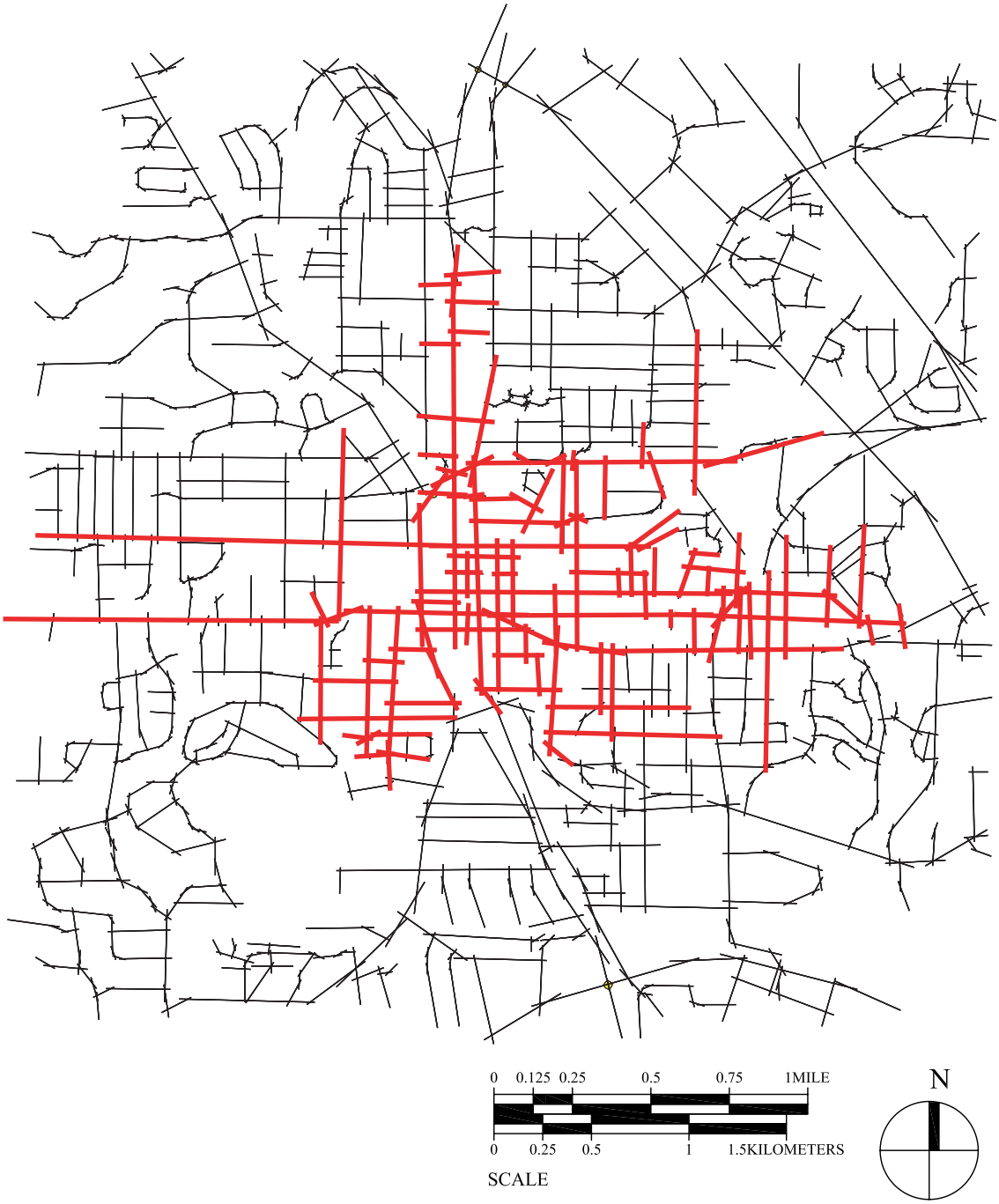

Figure 2.18 Two-Step Capture Map of Marietta, 2004

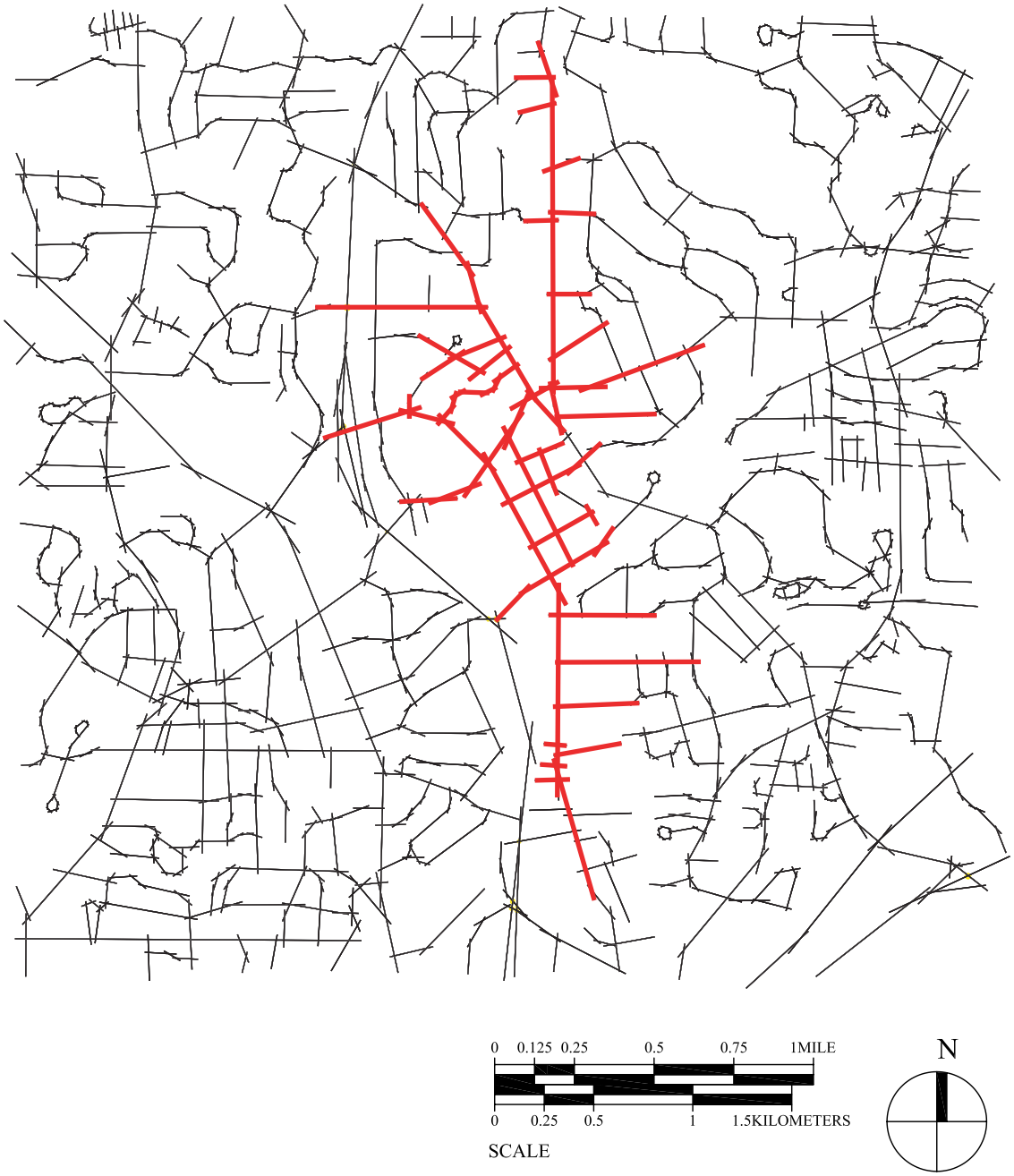

Figure 2.19 Two-Step Capture Map of Buckhead, 2004

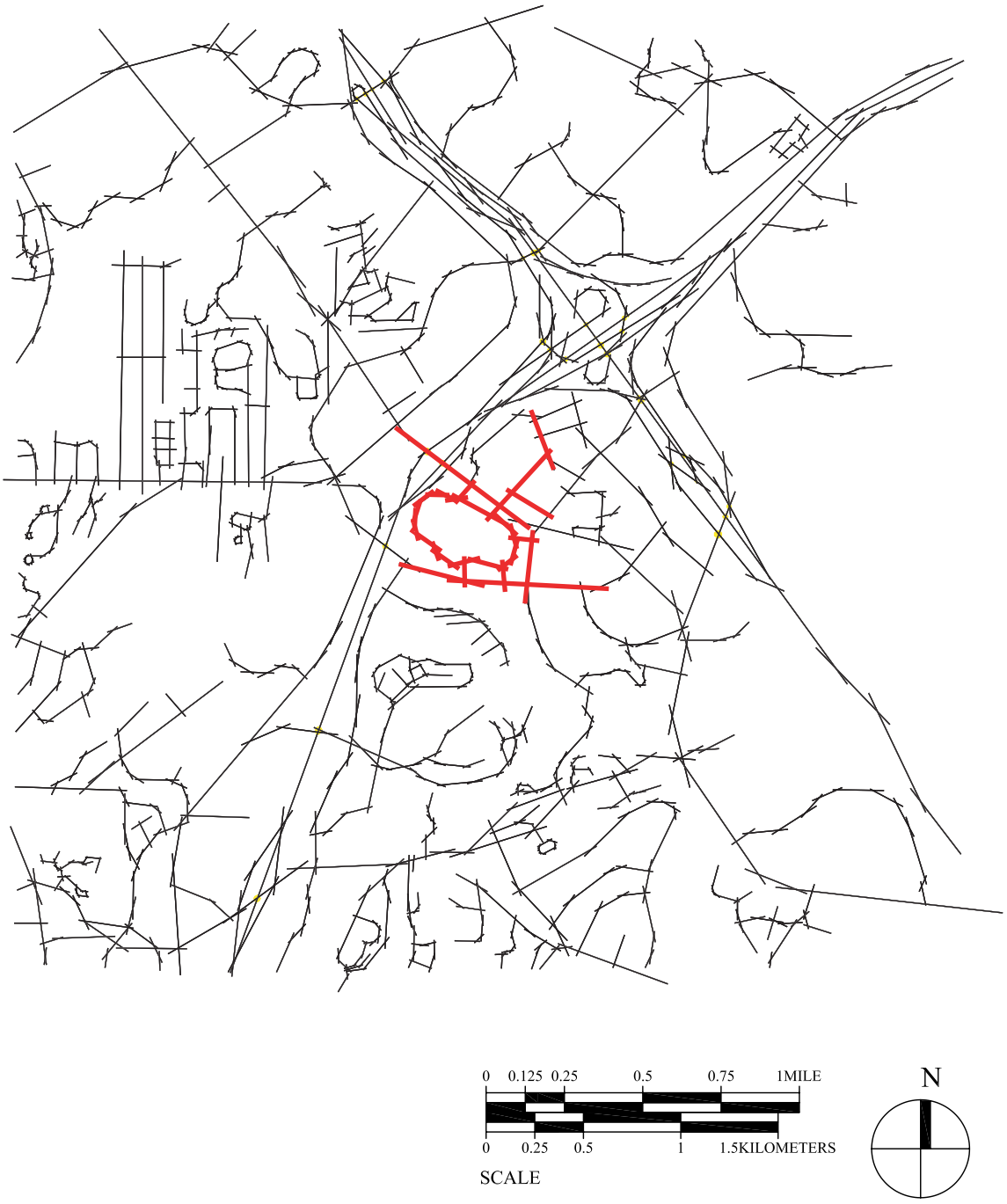

Figure 2.20 Two-Step Capture Map of Cumberland, 2004

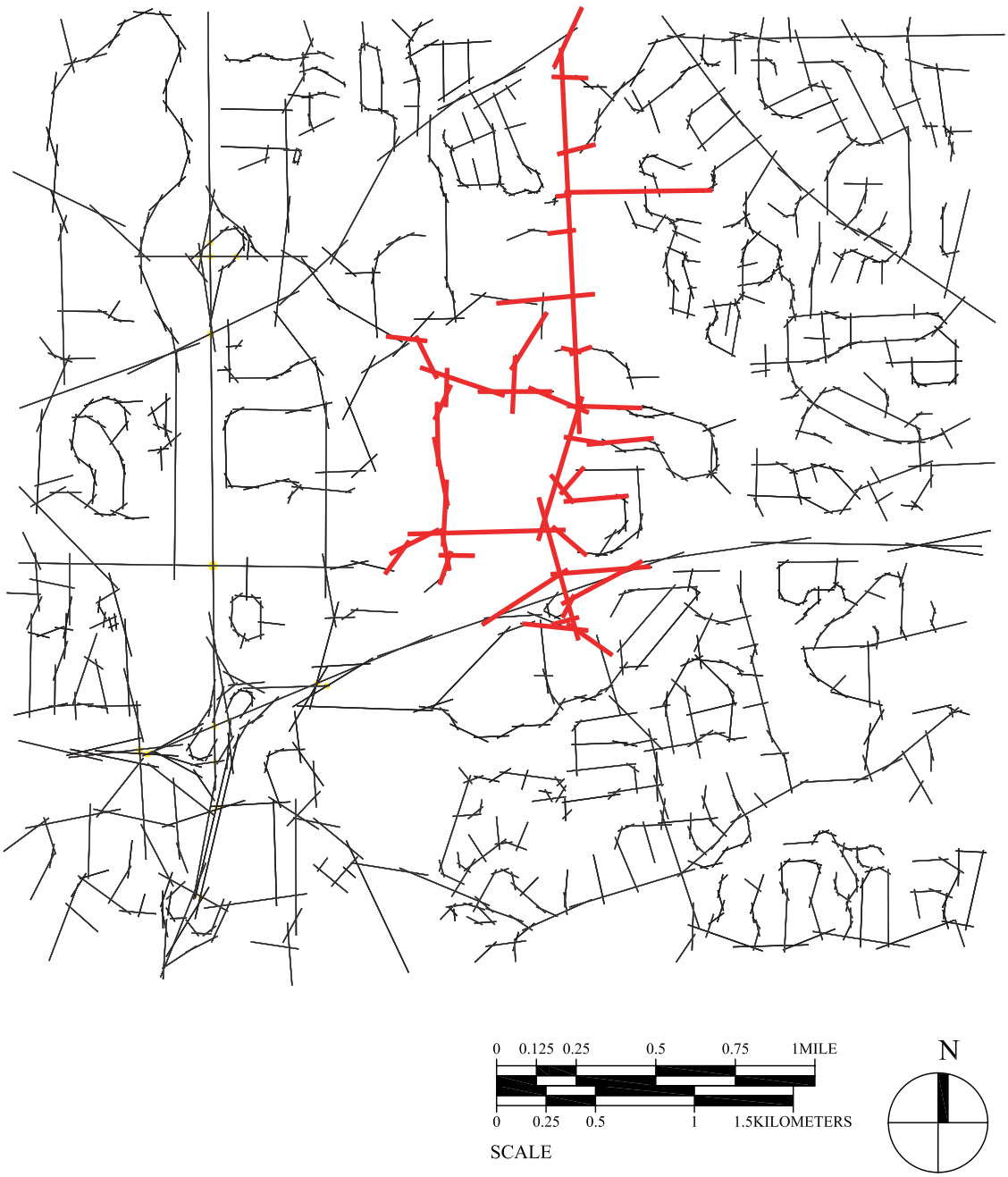

Figure 2.21 Two-Step Capture Map of Perimeter, 2004

the system, and vice versa. Fewer highlighted lines and smaller catchment areas in the edge cities indicate poor accessibility from the focal points to the surrounding districts while in the old towns more lines and larger coverage suggest better accessibility.

2.6 A Preliminary Discussion of Discontinuity in the Urban Morphology in Atlanta

The differences between the old and the new cities are quite apparent. The new cities develop on large properties and large urban blocks, in areas in which land was cheaper until relatively recently. They are integrated into the metropolitan system through freeways as well as pre-existing major roads. Their surrounding urban fabric is less integrated, less connected, more fragmentary, and less intelligible than the old cities. Even though the city hubs (often shopping malls) occupy the most integrated spaces in the surrounding area, they do not form part of a coherent system extending into the surrounding areas.

What might be the larger implications of these findings? In a paradoxical way, the local fragmentation of the fabric surrounding the new centers creates a kind of equivalence between the residential areas that lie within the 9 square miles vicinity of the commercial hub. A more homogeneous, connected, and integrated surrounding fabric would imply that the residential areas nearest to the commercial hub have more privileged access to it. This is not the case. In the new cities the commercial hubs are part of a global system of accessibility and the surrounding areas function as independent small fragments. This is in contrast to the old cities where central hubs are clearly embedded in the surrounding areas. In old cities, relationships of local and global orders

are more mediated. By contrast, the new cities are dependent upon, and in turn come to reinforce, a polarization between the local and global scales or organization.

According to this argument, Castells' dictum regarding global connection and local disconnection (Castells 1996, 404) is aptly exemplified at Cumberland, but is structurally applicable to all the new cities. Taking into account that the local fragments of the urban fabric are increasingly given to disjointed residential developments with a predominance of enclaves and cul-de-sacs, we see that the spatial polarization has a very particular social character. One pole is the family house within a spatially segregated community, only communicating with surroundings by a hierarchy of access roads. The other pole is the shopping mall which functions as a social as well as economic space of convergence.

2.7 The Elaboration of Spatial Layout Inside the Hubs of the New Cities

Large blocks and more open land are the main properties of urban layout in new cities. Over the last decades a process of transformation and growth has occurred inside the large blocks of the new cities. Transformation occurs as circulation into and around the blocks is arranged to take into account the needs for different kinds of access and parking. A secondary movement network or "pseudo-street system" (Conzen 1960) develops on privately owned land which intersects and complements the system of public streets previously analyzed. Growth occurs as primary buildings expand, and as new buildings get added, leading to further adaptations in the circulation system. In addition, changes in the edges of large buildings, whereby shops increasingly come to face outwards into the urban landscape rather than inwards towards the mall, intensify the

perceptual sense that larger urban blocks get broken into sub-blocks, each with its own face towards a shared urban field.

Using on-site observations, aerial photographs, and updated plans as available,[2] the effective urban movement network has been reconstructed, to include not only public streets but also secondary circulation on privately owned land. For the purposes of this analysis we do not consider the entire 9 square mile area previously analyzed, but only the blocks which constitute the hub, that is, the blocks with concentrated retail and office volumes that carry the greater burden of growth. Figure 2.22 to Figure 2.24 present a comparison between the line maps of the new center-hubs as previously analyzed, and the line maps representing the full network. Table 2.3 and Table 2.4 present comparative quantitative profiles regarding metric and syntactic properties.

While the average size of blocks surrounded by streets is 36.43 acres (14.74 hectares, or equal to 1,260 x 1,260 feet, 384 x 384 meters), the average size of sub-blocks arising after mapping the entire movement network is 6.75 acres (3.02 hectares, or equal to 542 x 542 feet, 165 x 165 meters). Thus, the reduction in block size is five-fold. This is the most obvious finding of the analysis. However, the data allows additional remarks. The size of the larger blocks surrounded by streets at the hubs of the new cities is smaller than the average size of blocks in the corresponding 9 square mile area (36.43 acres compared to 46.35 as seen by looking at Table 2.3 and Table 2.1). This confirms that centrality is associated with a relative reduction in block size as we shift from the edge to

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[2] The aerial photographs refer to Google Earth Map http://earth.google.com; the updated plans (in 2004) mainly refer to the Atlanta Metropolitan Aero Atlas in 2004.

Figure 2.22 Internal Growth of the Lenox Square-Phipps Plaza Area, 2004
Above: Street System;
Below: Entire Circulation Network
A: the Lenox Square Block B: the Phipps Plaza Block
C: the Tower Place Block

Figure 2.23 Internal Growth of the Cumberland Mall Area, 2004
Above: Street System;
Below: Entire Circulation Network

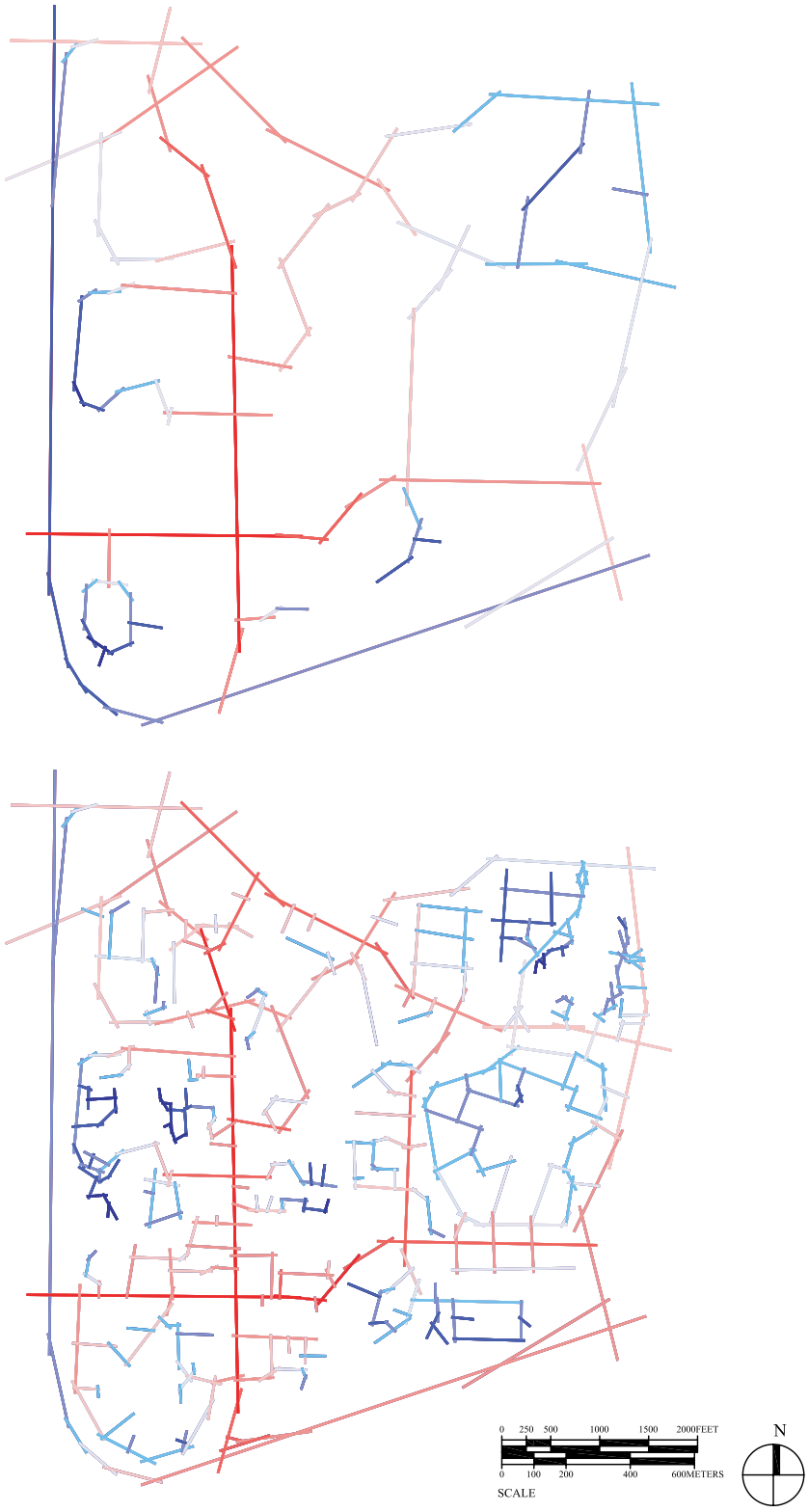

Figure 2.24 Internal Growth of the Perimeter Mall Area, 2004
Above: Street System;
Below: Entire Circulation Network

Table 2.3 Metric Properties of Street Systems and Entire Circulation Networks at the New Center Hubs

	Number of Lines	Number of Blocks	Block Size (acres)	Block Size (hectares)	Line Length (feet)	Line Length (meters)
The Lenox Square-Phipps Plaza Area						
Street System	49	14	27.80	11.25	1,055	322
Entire Circulation Network	306	91	4.28	1.73	434	132
The Cumberland Mall Area						
Street System	86	24	18.43	7.46	947	289
Entire Circulation Network	525	161	2.75	1.11	367	112
The Perimeter Mall Area						
Street System	84	13	63.05	25.52	1,017	310
Entire Circulation Network	375	62	13.22	5.35	503	153
Average						
Street System	73	17	36.43	14.74	1,006	307
Entire Circulation Network	402	105	6.75	3.02	435	133

the hub of an area. Also, the sub-block size emerging after the mapping of the entire movement network is smaller than the average size of the urban block surrounded by streets in the old historic towns (6.75 acres compared to 13.00 as seen by looking at Table 2.3 and Table 2.1). Thus, the hubs of the new cities are simultaneously associated with an expansion and a reduction of scale depending on whether we consider the street system or the effective movement system as a whole.

The average line length for the street system surrounding the center-hubs is 1,006 feet (306 meters). It falls to 435 feet (132 meters) when we consider the entire network,

Table 2.4 Syntactic Properties of Street Systems and Entire Circulation Networks at the New Center Hubs

	Real_ Int. R(3)	Real_ Int. R(n)	Conne-ctivity	Correlation of Real_Int. R(3) and Connectivity	Correlation of Real_Int. R(n) and Connectivity	Correlation of Real_Int. R(3) and Real_Int. R(n)
The Lenox Square-Phipps Plaza Area						
Street System	1.538	0.826	2.612	0.971	0.594	0.656
Entire Circulation Network	1.651	0.918	2.778	0.909	0.569	0.692
The Cumberland Mall Area						
Street System	1.586	0.847	2.700	0.961	0.658	0.762
Entire Circulation Network	1.646	0.957	2.750	0.883	0.491	0.656
The Perimeter Mall Area						
Street System	1.293	0.601	2.238	0.933	0.445	0.549
Entire Circulation Network	1.550	0.720	2.619	0.863	0.397	0.559
Average						
Street System	1.472	0.758	2.517	0.955	0.566	0.656
Entire Circulation Network	1.616	0.865	2.716	0.885	0.486	0.636

(Note: All correlations are significant at 0.001 level (2-tailed).)

more than a two-fold reduction. A richer picture emerges when we look at the data more comprehensively. The average street length around the new center hubs is longer than the street length in the 9 square mile surrounding area (1,006 feet as compared to 717 as seen by looking at Table 2.3 and Table 2.1) and almost the same as the average street length in the older areas analyzed (987 feet in Table 2.1). Simultaneously, the average circulation space is much shorter, indicating that the internal block structure is linearly very broken up.

The process of syntactic evolution breaks down large land lots, generates secondary functional circulation system for more efficient movement, and simultaneously transcends the clear distinction between public and private circulation systems. In the process, the system becomes more integrated and accessible with denser syntax for more movements, and more interface between buildings and pedestrians. All of these syntactic changes confirm the "Siksna"-like process occurring to the interior of large blocks in the urban development of new cities.

The subtler consequences of the elaboration of internal block layouts are revealed when we look at syntactic variables. In all cases, the internal elaboration of block layouts leads to an increase in overall integration (Real_Int. R(n)), integration measured to radius 3 (Real_Int. R(3)), and connectivity. At the same time, there is a decrease in all correlation-based variables, indicating that local and global syntactic variables become more dissociated when the entire network of circulation is taken into account, in addition to the configuration of streets. Thus, the creation of a finer urban mesh and the enhancement of integration bring no concomitant increase in the intelligibility of the relationship of parts to the whole. To some extent, this was to be expected. The development of the secondary network of connections serves the needs of each property without regard, and often in an antagonistic relation to the needs of adjoining properties. Consequently, both the finer mesh and the increase of integration could occur as a byproduct of each set of adjoining properties evolving to best capitalize upon the advantages of location with respect to the metropolitan system but not with respect to the evolving local condition. Before entertaining this hypothesis further, it is important to

look beyond the aggregate quantitative picture, into the finer grain of the layout on the ground.

2.8 Cross-Cuts and Ripple Effects: A Closer Look at the Elaboration of Layouts in the Hubs of Edge Cities

Buckhead exemplifies a finer grain morphological contrast which is of potentially strategic relevance. It encompasses three blocks of particular interest: the block comprising Lenox Square surrounded by Peachtree Road, Lenox Road, GA 400, and the Norfolk Southern railway line (Block A in Figure 2.22); the block comprising Phipps Plaza surrounded by Peachtree Road, Wieuca Road, Phipps Boulevard, and Buckhead Loop (Block B in Figure 2.22); and the Tower Place block surrounded by Peachtree Road, Piedmont Road, Buckhead Loop, and GA 400 (Block C in Figure 2.22). In the first two blocks, all spatial evolution is constrained by the presence of very large building masses (the malls themselves) in the middle of the block. Providing access to the various primary, secondary, and service entrances associated with these large buildings results in the creation of secondary circulation loops which "ripple off" between the perimeter of the buildings and the perimeter of the site. As a consequence, peripheral movement involves many more changes of direction in the case of Phipps Plaza, where the building mass is less regular, than in the case of Lenox, where growth has resulted in a more compact pattern of land occupancy. From a syntactic point of view, the consequence of the "ripple effect" is the inability to provide efficient short-cuts through the middle of the block. In the case of Phipps Plaza, shortcuts are only possible if one becomes familiar with the multilayered underground parking system. But even then, the possibility of

cutting a route under the mall is compromised by the complexity of the various access ramps that negotiate the changes of grade.

On the contrary, shortcuts are possible in large blocks where the original pattern of subdivision of properties led to a different disposition of building masses. This is exemplified in the case of the third block mentioned above. There, the process of urban evolution has led to two transverse circulation routes which effectively break the block into sub-blocks. Some of these routes are currently accessible only to those in possession of a pass card for the corresponding parking lots. However, even without pass cards, it is possible to move from the Buckhead Loop, to Piedmont Road and / or to Peachtree Road, using passages that lie entirely inside the original block. In addition, with required zoning approved process, it is possible to cross Piedmont Road and continue from the secondary system of the block into the adjoining block on the other side. In this case, the secondary system not only breaks up the primary block under consideration, but also extends into adjoining blocks as if to suggest a hierarchy of two superimposed networks: the street network and the secondary circulation network. The syntactic implication of this condition is that some secondary passages become parts of the integration core of the area under consideration and compete, in this respect, with the formally recognized streets.

Similar issues come to light when the other two edge cities are considered. An important theoretical consequence follows. The social logic of the pattern of spatial evolution under consideration is conditioned by three constraints. The first, and more obvious, constraint is the scale and location of building masses. This determines whether shortcuts are possible or whether the ripple-off pattern of secondary circulation is

necessary. The second, and less obvious, constraint is the distribution of property lines which determines the possible placement of the original buildings. Some of the secondary passages evolve at the interstices between buildings on adjoining properties, where regulations dictate setbacks. Thus, secondary passages are often aligned to property lines. The third and most restrictive constraint is the land ownership. As previously discussed, the secondary circulation system is created in private land. If more than one piece of land is involved, different land owners may have different interests. This may cause conflict between demands for different spatial layouts or certain restrictive use of some spaces. Therefore, reconciliation among different land owners becomes necessary. Further discussion related to this issue will be made in a later chapter.

2.9 Discussion: Spatial Dynamics and Spatial Morphogenesis

The first part of this chapter identified metric and syntactic differences between new and old cities of urban life in Atlanta. The second part dealt, in a very preliminary way, with a process of spatial evolution within the hubs of the new edge cities. In essence, it addressed how a description of morphological difference can be complemented by an account of morphological process. To deal with process is to capture not only spatial descriptions but also spatial dynamics. From the point of view of description, the difference between the old and the new cities can be summarized as follows. The old cities have a spatial structure which mediates between local and global scales of spatial organization. The new cities express a fundamental original polarization and discontinuity between local and global scales. From the point of view of spatial dynamics, however, the difference lies in the relationship between streets, properties and

buildings. The evolution of old cities is characterized by the relative permanence of the street system, as a framework for the negotiation of property boundaries and the construction of buildings. In the new cities, by contrast, the scale of the urban blocks and properties allows buildings to emerge before, or at the same time as, the effective secondary circulation network. In one case, buildings take advantage of the pre-existing spatial morphology of movement under the constraints of property lines. In the other case, the spatial morphology of movement comes to link a system of buildings, under the constraints of property lines and a pre-existing framework of streets.

The creation of sub-blocks and a finer effective urban mesh in the hubs of new cities indicates that over time the morphologies of new and old cities may come to converge. The hypothesis of convergence would make sense from the point of view of the spatial economy of movement (Hillier 1996). In exchange oriented environments, the creation of an interface between the network of movement and the fronts of buildings is paramount. This would account for the process of block fragmentation. Fragmentation and the creation of a secondary movement network create a more extensive, better distributed, and denser interface between buildings and movement. However, such an interface works according to the degree to which the spatial structure distributes movement to the various parts of the system. If the addition of internal roads and connections is not associated with an increase in the overall intelligibility of the system then the urban fabric may work to provide access but not to provide a structure that would encourage the diffusion and distribution of movement patterns over the area. Thus, we have to draw a distinction between the convergence of metric properties and the convergence of syntactic properties. The analysis shows that one kind of convergence

does not necessarily bring about the other. From a syntactic point of view, the edge cities of the Atlanta area under investigation show a pattern of divergence which persists even as blocks get effectively fragmented.

This issue will be further explored in Chapter 4, when the evolution of a particular block in Buckhead will be traced in greater detail.

CHAPTER 3

BUCKHEAD: THE EVOLUTION OF THE STREET NETWORK

In this chapter the evolution of the street network in Buckhead is studied in greater detail. Buckhead is a distinctive example of how a previous suburban area turned into a new edge city during the past fifty years. It has grown to be a major urban center in the City of Atlanta, comparable to the traditional central business districts—Downtown and Midtown. In addition to the large shopping malls mentioned earlier, Buckhead has high density office, residential and hotel developments, in close proximity to one another. It is also known as an entertainment and cultural district with many bars, restaurants, galleries, and night clubs. The process of urban evolution of Buckhead is traced from 1950 to 2004, with an emphasis on the incremental changes of street framework, and the transformation of land use patterns. A series of axial maps shows the dynamics of the syntactic patterns caused by the changes within the street network. The land use maps shows the coexistence of central commercial districts and large surrounding residential areas, which suggests conflicts between different land use patterns, landowners' interests and neighborhood interests. Examining the spatial dynamics in syntactic patterns and spatial conflicts in land use patterns occurring in Buckhead's evolution provides an approach to study the mechanism of urban growth.

3.1 How Did a Suburban Area Turn into an Edge City?

The first task is to define "Buckhead." The official boundaries of the Buckhead Community are: the city of Atlanta limits / DeKalb County line to the east; the city limits line to the north; the city limits / Cobb County line to the west; and Peachtree Creek from

the Chattahoochee River to Interstate 75, Interstate 75 to Interstate 85, and Interstate 85 to DeKalb County to the south (Buckhead Coalition[1] 1998, 5; see Figure 3.1 and Figure 3.2 for the location in the City of Atlanta and the boundary[2]). The total area contains approximately 28 square miles and is about 4 miles to the North of Atlanta's Downtown. The area north of Buckhead, beyond the Atlanta city limit, is Sandy Springs. In the Buckhead area, the main east-west street is West Paces Ferry Road, named for a former ferry across the Chattahoochee River (see Figure 3.2). The main north-south street is Peachtree Road, which extends south into the heart of the city as Peachtree Street (see Figure 3.2). The name change is used to define a border between Buckhead and Midtown.

According to the literature, Buckhead as a name describing a geographical community originates in the 19th century. The area of Buckhead was first occupied by Indian tribes. By the 1820's, they had sold most of their lands to the white men. In 1838, Henry Irby from South Carolina purchased 202 1/2 acres,[3] now known as the Land Lot 99 of District 17 (Figure 3.2 and Figure 3.3) and the current center of Buckhead, for $650. He built a tavern and grocery store near the old Indian trail which is now the

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[1] The Buckhead Coalition is an organization of business and civic leaders who are interested in improving the quality of life and sustainable growth in the Buckhead community. The current president is Sam Massell. The organization has published the annual magazine, *Buckhead Guidebook*, since 1995. The magazine includes all updated news and important data for buildings and new developments in the Buckhead community.

[2] The boundary definition was adopted in 1982 by the Buckhead Business Association, in 1988 by the Buckhead Coalition, in 1990 by the Georgia House of Representatives, and in 1991 by the Atlanta Regional Commission.

[3] The formal grid system of Atlanta started with the subdivision of the original four land lots, which is now the central business district in Downtown. Each lot was 202 1/2 acres (0.562 x 0.562 mile), and then Atlanta grew by the addition of land lot units. So 202 1/2 acres became the basic unit of land lots in Atlanta (Garrett 1954).

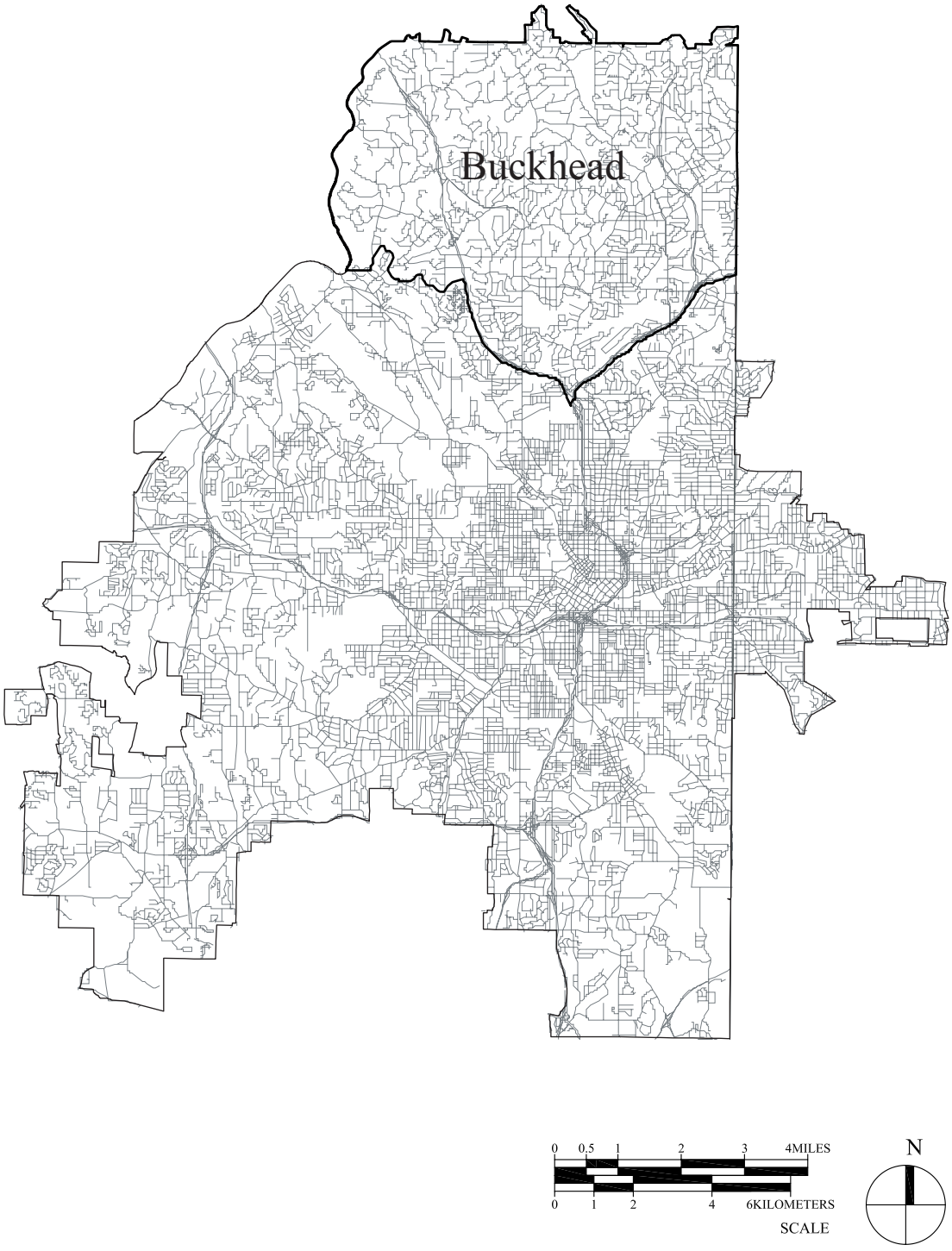

Figure 3.1 Map of the City of Atlanta and the Boundary of Buckhead, 2004

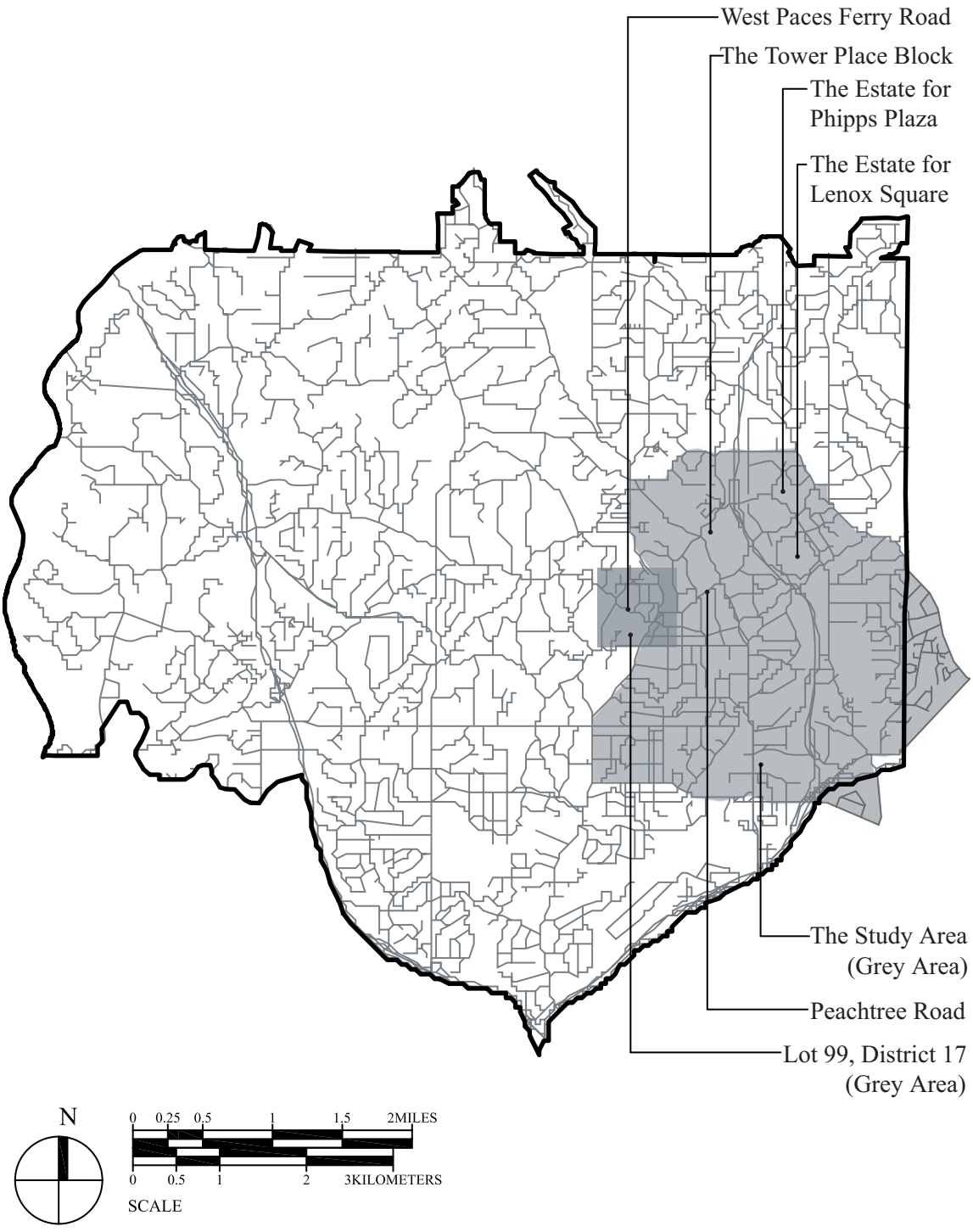

Figure 3.2 Map of Buckhead and the Locations of Lot 99, District 17 (Grey Area) and the Study Area (Grey Area), 2004

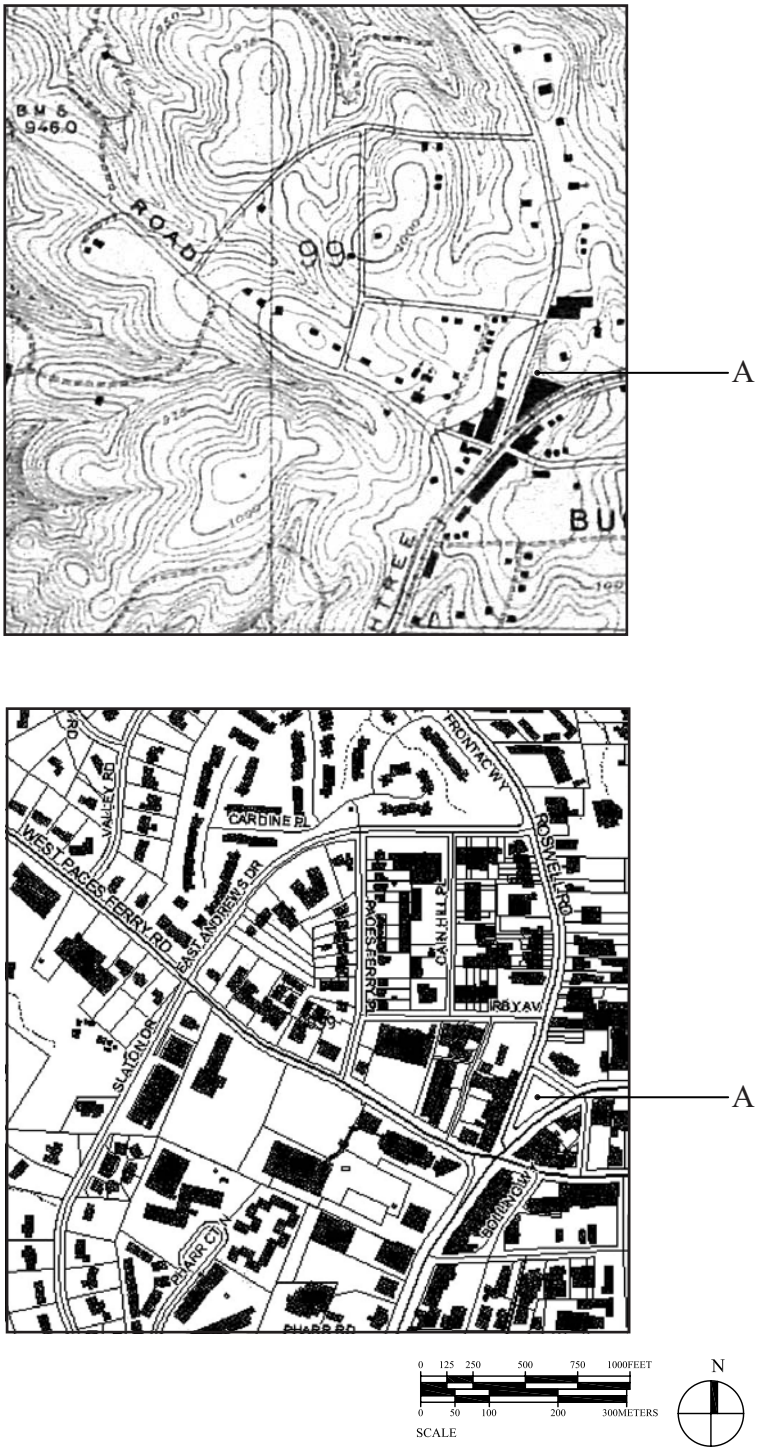

Figure 3.3 General Site Maps of Lot 99, District 17 in 1928 and 2005
Above: Lot in 1928
Below: Lot in 2005
Point A: The Original Triangle of Buckhead
(Map Source: Above: Georgia Aerial Surveys, Inc. 1928;
Below: Fulton County GIS Website.)

intersection of current Peachtree Rd, West Paces Ferry Rd and Roswell Rd where the triangle park is located (see Point A in Figure 3.3). Today's Buckhead was developed around this triangle. The area was once named "Irbyville" after him. The name of "Buckhead" originated around 1838—it was said that Irby had killed a large deer in the nearby woods and mounted the buck head on a post outside the tavern. The name "Buckhead" became well-known and is still used today (Garrett 1954, 160).

The second task is to determine how Buckhead was formed as a suburban area originally and how this suburban area was transformed into an edge city. Before the 1830's, the Buckhead area was in the unpopulated wilderness. At the turn of the century, Buckhead was still lightly populated. In the early 20th century, more and more elite upper class moved into the area, and Buckhead became a trendy suburban area north of Atlanta. In 1920, Buckhead had a population of 2,603, compared with a population of 200,616 for City of Atlanta (see Table 3.1). In 1952, Buckhead was annexed into the city of Atlanta and became an incorporated area.

One estate in the area became the site of Lenox Square mall in 1959 (see Figure 3.2). The land covered 74 acres along Peachtree Road. The owner was John Ottley, an Atlanta banker and sportsman. He purchased the land around the turn of the century to build a summer country home and a stable for his horses. Before World War I, the wider availability of automobiles allowed the Ottleys to move there permanently. This started the trend of building luxurious homes north of Atlanta. On May 22, 1956, the Samuel Roberts Noble Foundation bought the land, as the site for a shopping center. The new center was designed by one of the pioneer architects of Modernism in Atlanta, Joe Amisano. On June 28, 1958, the shopping center, Lenox Square mall, was completed.

Table 3.1 Population Comparison Between Buckhead and the City of Atlanta from 1920 to 2000

Year	Population		Population Percentage (Buckhead to Atlanta)
	Buckhead	The City of Atlanta	
1920	2,603	200,616	1.30%
1930	10,356	270,366	3.83%
1940	16,814	302,288	5.56%
1950	26,794	331,314	8.09%
1960	49,018	487,455	10.06%
1970	56,016	496,973	11.27%
1980	50,642	425,022	11.92%
1990	55,534	394,017	14.09%
2000	66,772	416,474	16.03%

(Data Source: United States Census Bureau, Decennials.
Note: Buckhead from 1920 to 1950 is defined as District 722.
Buckhead after 1952 is defined as U.S. Census tracts numbered 90, 91, 93, 94, 95, 96, 97, 98, 99, 100.)

The grand opening was held in August 1959. The mall was constructed to be open-air at first and the total floor area encompassed 665,000 square feet (61,800 square meters). Two department stores, Rich's and Davison's, were the anchors connected to 60 retailers and one grocery store with landscape and a plaza. The mall became enclosed after its first major expansion in 1972 and Neiman Marcus, a new anchor department store, was added. There were more expansions in the 1980's. In 1995, the mall had its largest expansion. After completion, the mall's total floor area reached 1,450,000 square feet (135,000 square meters) with 250 stores and restaurants making it the largest shopping center in the south at the time (Buckhead Coalition, 2008; Buckhead Community, Buckhead and Lenox Square Website; Simon Malls, Lenox Square Website; Wikipedia, Lenox Square Website).

The second mall, Phipps Plaza, is located in the block diagonally across Lenox Square, on Peachtree Road. It opened in 1969 and was the first multi-level mall in the region. It aimed to be an upscale luxury shopping destination. Saks Fifth Avenue and Lord & Tayor were the two anchors. Parisian was added as the third anchor in 1992's expansion. In 2004, Nordstrom replaced Lord & Taylor and Parisian changed its name to Belk in 2007. The mall had been a rival of Lenox Square until they were both acquired by the same owner, Simon Property Group, in 1998. Today's Phipps Plaza has about 110 specialty stores and restaurants, as well as a 14-screen AMC movie theater. It contains three levels with a total floor area of 821,000 square feet (76,300 square meters) (Buckhead Coalition, 2008; Simon Malls, Phipps Plaza Website; Wikipedia, Phipps Plaza Website).

The erection of the two malls can be considered the most important factor in the history of urban development in the Buckhead area. In the beginning, the developers faced the challenge of convincing retailers that Atlanta's business future would be in the middle of an undeveloped grassy field a considerable distance from the traditional central business district. After 50 years, their success has proven the thought to be true. The malls triggered large developments of the area and made the previous suburb an economic hub.

Today, Buckhead is one of fastest developing areas in the Metropolitan Atlanta Area. From 1920 to 2000, Buckhead's population increased 25.65 times from 2,603 to 66,772; while at the same time, the city of Atlanta population only increased 2.07 times from 200,616 to 416,474 (Table 3.1). The table shows the consistent increase of Buckhead's population compared to that of the city of Atlanta—from the original 1.30%

to the current 16.03%. Additionally, from the literature, a table comparing non-residential buildings and population densities between Buckhead and three traditional towns was produced (Peponis et al. 2007b; see Table 3.2). In 2001, Buckhead's building density and population density ranked second to the traditional central business district, Atlanta Downtown, ahead of both Decatur and Marietta. This confirms that Buckhead had become the urban concentration for buildings and population.

Table 3.2 Density Comparison Between Buckhead and Three Traditional Towns in 2001

Cities	Non Residential Building Density		Population Density	
	Square Feet / Square Mile	Square Meters / Square Kilometer	Population / Acre	Population / Hectare
Buckhead	2,3443,43	84,152.76	5.85	14.46
Atlanta Downtown	4,111,629	147,487.83	10.53	26.03
Decatur	589,011	21,145.28	5.72	14.16
Marietta	756,218	27,148.97	4.42	10.93

(Data Source: Peponis et al. 2007b, 4-5)

According to the Buckhead Coalition's current estimate, Buckhead has approximately 21,000,000 square feet of office space, two of American's prestigious malls, more than 40 neighborhoods, over 5,000 hotel rooms, 1,400 retail stores, 200 dining places, 21,600 multifamily units, and 16,300 individual homes. Seventy thousand people live in Buckhead, and the daytime population is estimated to be 140,000 (Buckhead Coalition 2007, 21). Garreau has set up certain criteria for being an edge city—more than five million square feet of office space; more than 600,000 square feet of retail space or the equivalent size of the mall; more population during the workday; perceived as one place but not like a "city" thirty years ago (Garreau 1991, 6-7).

Pursuant to the numbers and profiles of above, Buckhead satisfies the requirements of an "edge city" from any perspective.

One additional element of the edge city must be addressed. With urban development, the previous suburban area located on the edge of the city has become a real central business district, both geographically and functionally. Garreau and Lang had another term, "uptown," to describe this urban pattern. They considered uptowns to be a subset of edge cities which were built on pre-automobile settlements, usually a few miles from the traditional downtown, with their originations dating back to the 1800s. Two main forces drove the growth of uptowns—a decentralizing population and transportation improvements. They are more fully developed than regular edge cities, and provide fresher, less crowded, and often more upscale business environments. Buckhead was at the top of their uptown list (Garreau 1991, 113; Lang 2003, 8). Thus, tracing the history of Buckhead—the previous edge city and the new uptown's urban evolution not only exhibits the entire process of suburban residential fringe area transformation into the mature central business district, but also indicates the future for those comparatively young edge cities.

3.2 A Morphological Approach to Studying the Urban Evolution of Buckhead

The president of the Buckhead Coalition, Sam Massell, has concluded that Buckhead experienced three significant changing moments in the history of its urban development. First was the construction of two large shopping malls, which stimulated the formation of the urban center. Second was the introduction of the highway system into the area and the subsequent changes in the street network, which critically shaped the urban fabric of current Buckhead. Third was the construction of large numbers of high-

rise condominiums, which created a new residential pattern distinct from the traditional residential neighborhood, turning Buckhead into a place for both working and living (Massell 2007).

In order to trace all critical changes and the entire evolutionary process of urban growth in Buckhead since the construction of the malls, a study area is defined as shown in Figure 3.4. The area is 2.5 mile x 2.5 mile, includes the two mall blocks, the original triangle, the Tower Place block, and the surrounding environments. The boundary starts at Roswell Road, follows North Ivy Road, Old Ivy Road, Wieuca Road, Roxboro Road, Buford Highway, Lindbergh Drive, Peachtree Road, and closes at Roswell Road. In the study, the *Space Syntax* method is applied to examine the changes of syntactic patterns for the urban structure and regulatory framework. Plus, the traditional morphology method is used to examine the elements of urban fabric with emphasis on land subdivision and land use patterns. The street map series was constructed using the available maps and data[4] from the 1950s to 2000s, with one snapshot for each decade for

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[4] The main reference is the Atlanta Metropolitan Aero Atlas, by Aero Surveys of Georgia, Inc. located at the Georgia Institute of Technology Main Library. The map series started from 1959 and was issued every two years until 1967, after which it was issued every year. The map series includes streets, highway systems, blocks, and some important buildings such as schools and shopping centers. The maps initially covered three counties, Clayton, DeKalb, and Fulton, then added three more, Cobb, Douglas, and Gwinnett.
Other references include:

1. Realty Atlas, Fulton County, Georgia, by First American Real Estate Solutions located at the Georgia Institute of Technology Main library. The map series started in 1973 and ended in 2000, and was issued approximately every three years. It provided information about streets and parcels, including changing patterns of land subdivision and parcel boundaries;
2. Atlanta Region Aerial Photography, by Georgia Aerial Surveys, Inc. at the Georgia Institute of Technology Main Library. The map series includes comprehensive site plan from 1928, and aerial photos taken in 1968, 1972, 1988, 1995 and 1997;

a total of seven. All the streets shown in the maps are public streets. Private roads are not included. Computer analysis shows the map series integration pattern in both local (Figure 3.5 to Figure 3.11) and global (Figure 3.12 to Figure 3.18) value. The first part of the study analyzes the metric properties such as total and average street length, block numbers, and size. The second part of the study combines land use documents and examines the changes in land use patterns. Both existing and proposed land use maps are examined in two different times—the 1960s and 2000s. The purpose of comparing these maps is to understand the differences in land use in urban growth and the discrepancy between the real situation and the proposed land use plan. The third part of the study explores the syntactic map series created above, and looks into the dynamics of syntactic patterns during their evolution, both local and global.

3.3 Changes in Structural Framework: Local Disconnection and Global Connection

Peponis and his group compared 25 urban areas in the Atlanta metropolis, including Buckhead, to find the differences in spatial structure. They found that Buckhead had much less metric reach (Rv) (Metric Reach measures the total street length which is available within a network-distance radius, on average, from each road segment

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3. Atlanta, GA in Sanborn Map, 1951 and 1979 versions microfilm at the Georgia Institute of Technology Main Library. They contained the information for streets, land subdivisions, parcels, and buildings including stories, uses, and footprints;
4. General Site Maps, Fulton County, GIS website http://wms.co.fulton.ga.us/. The maps shown in the website database are a collection of aerial photos from 1993 to 2007, and most updated comprehensive physical information such as streets, land subdivisions, parcels, and building footprints;
5. Google earth map and aerial photography showing the basic current layout of streets and internal roads, building footprints, and at least a basic sense of building volumes.

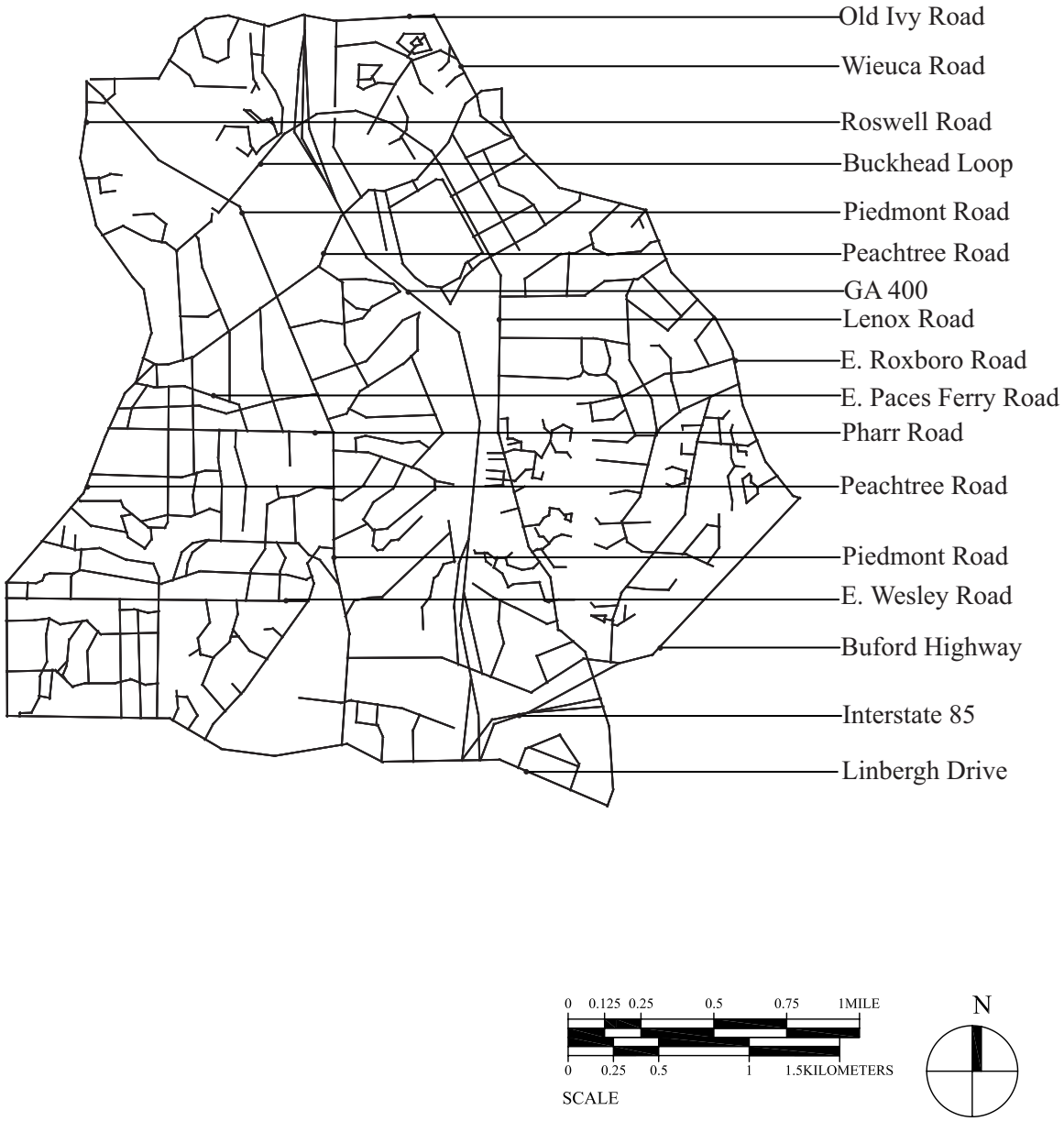


Figure 3.4 Map of the Study Area in Buckhead and Some Streets Within the Area, 2004

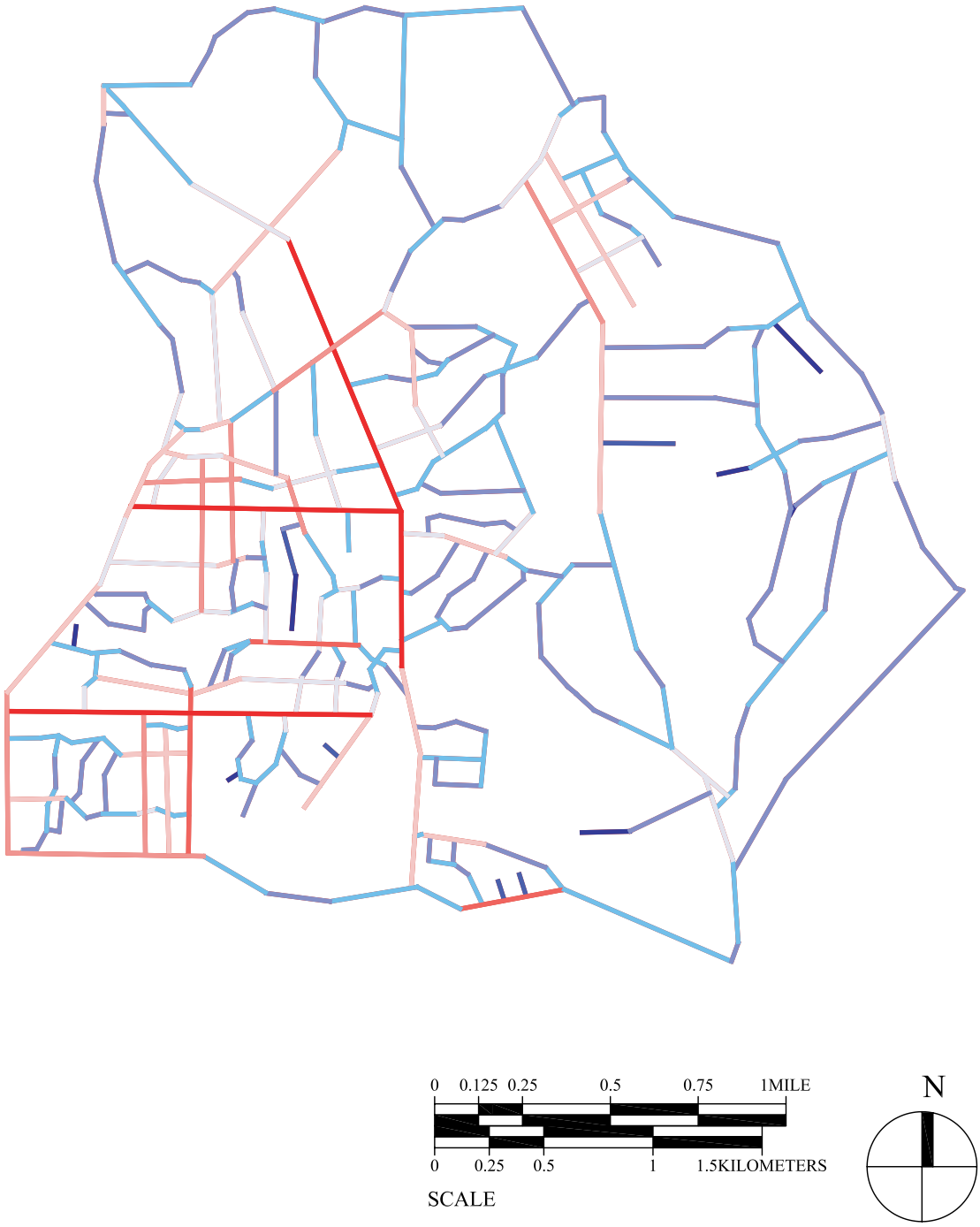


Figure 3.5 Local Integration Map of the Study Area in Buckhead, 1951

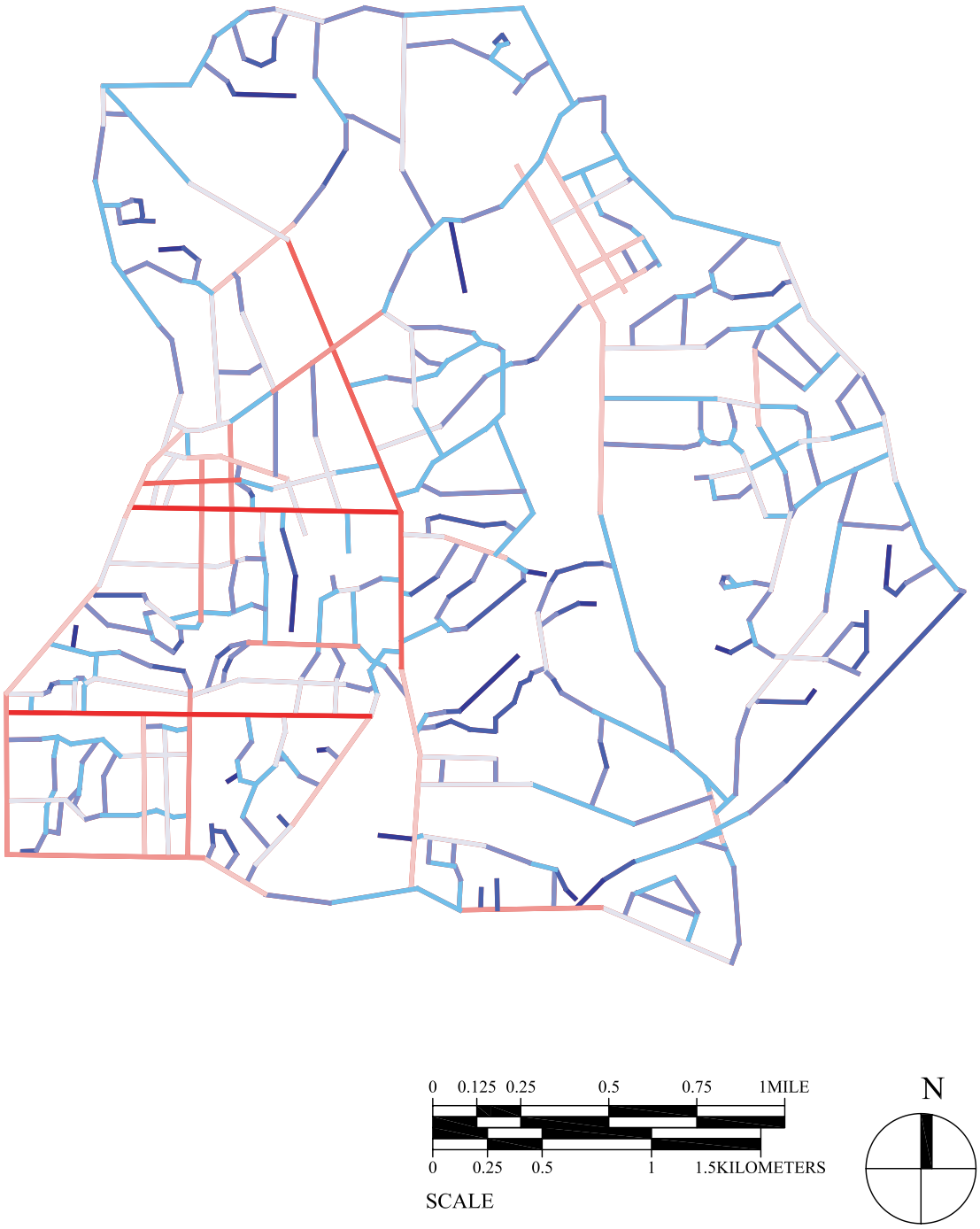


Figure 3.6 Local Integration Map of the Study Area in Buckhead, 1963

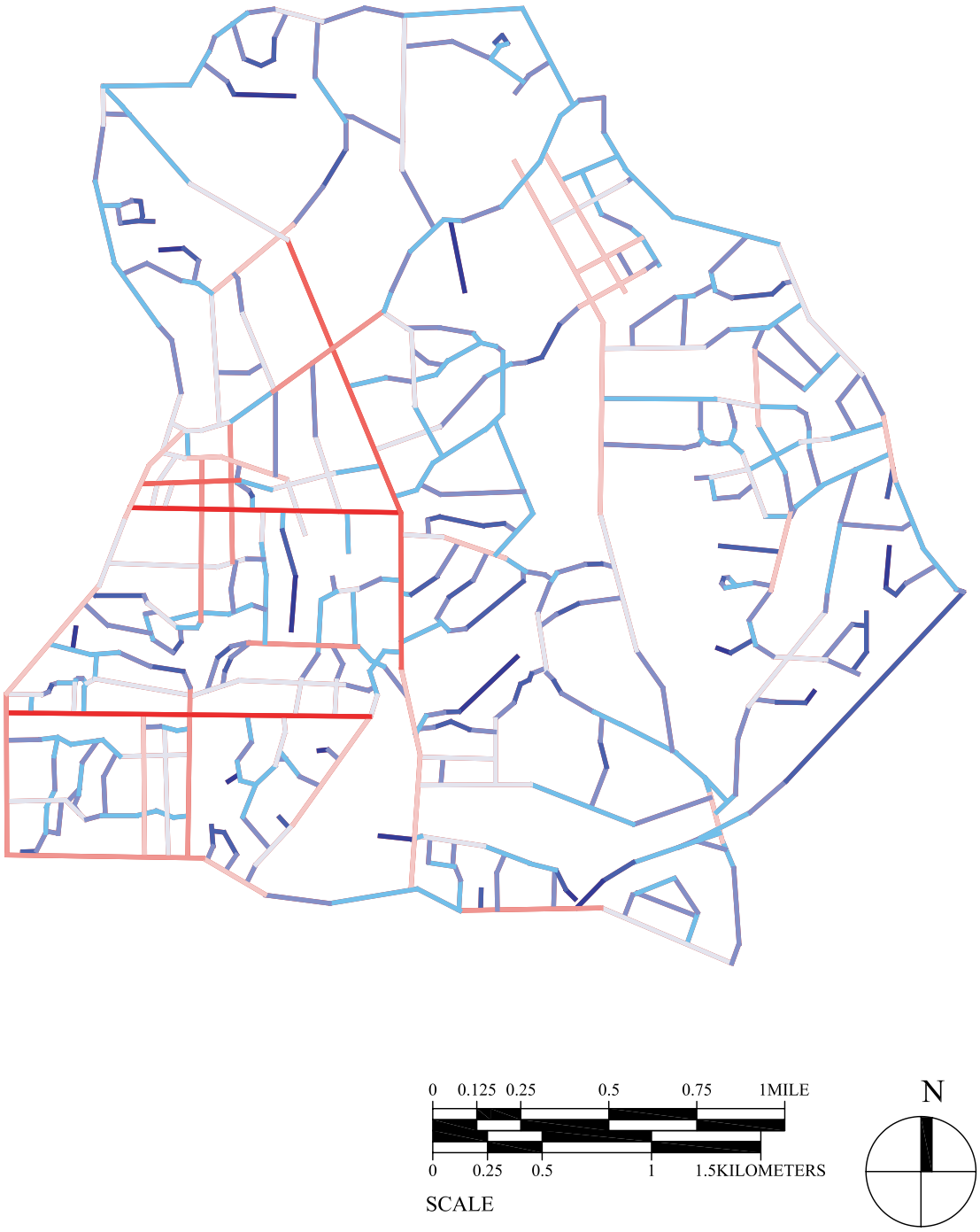


Figure 3.7 Local Integration Map of the Study Area in Buckhead, 1971

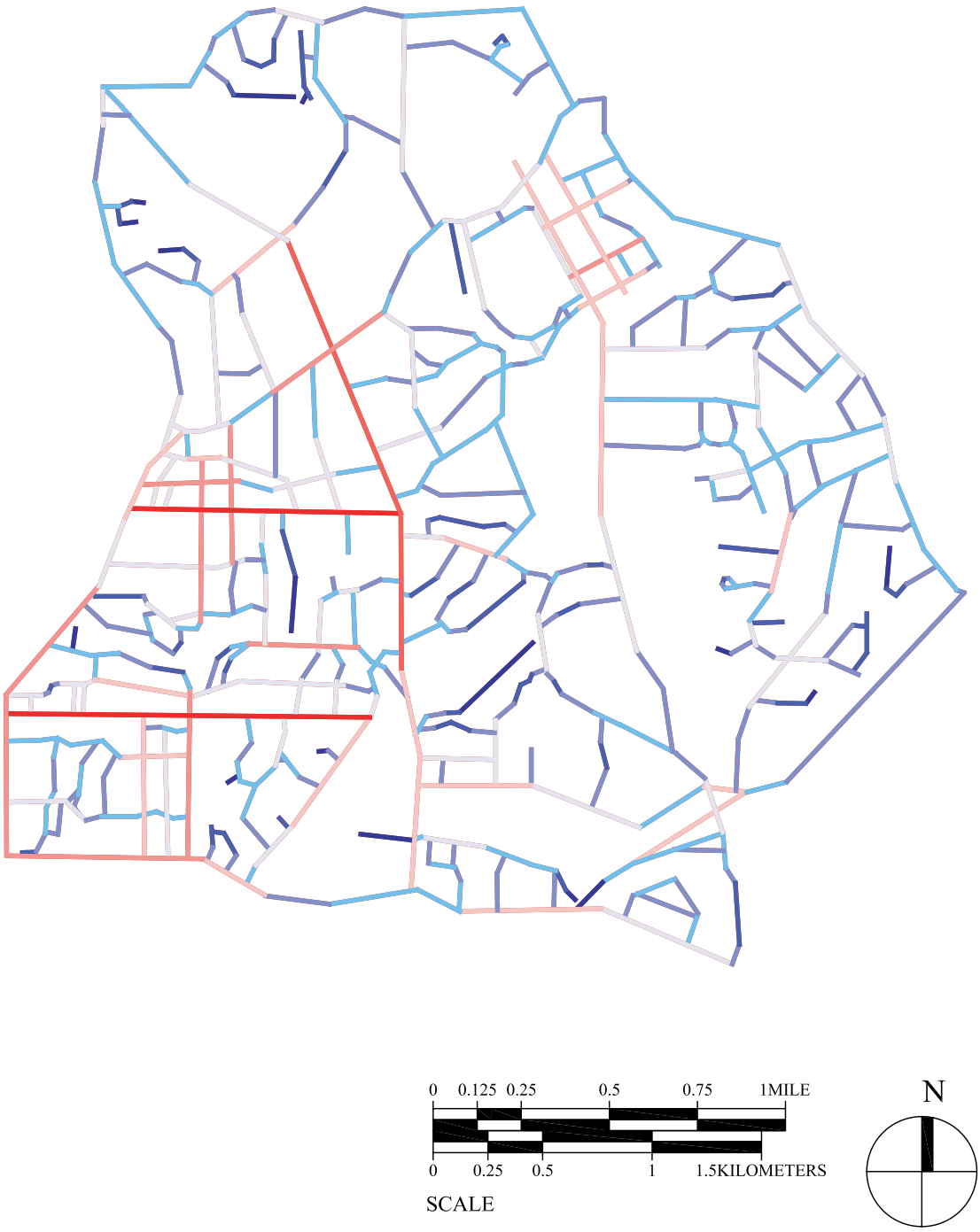


Figure 3.8 Local Integration Map of the Study Area in Buckhead, 1982

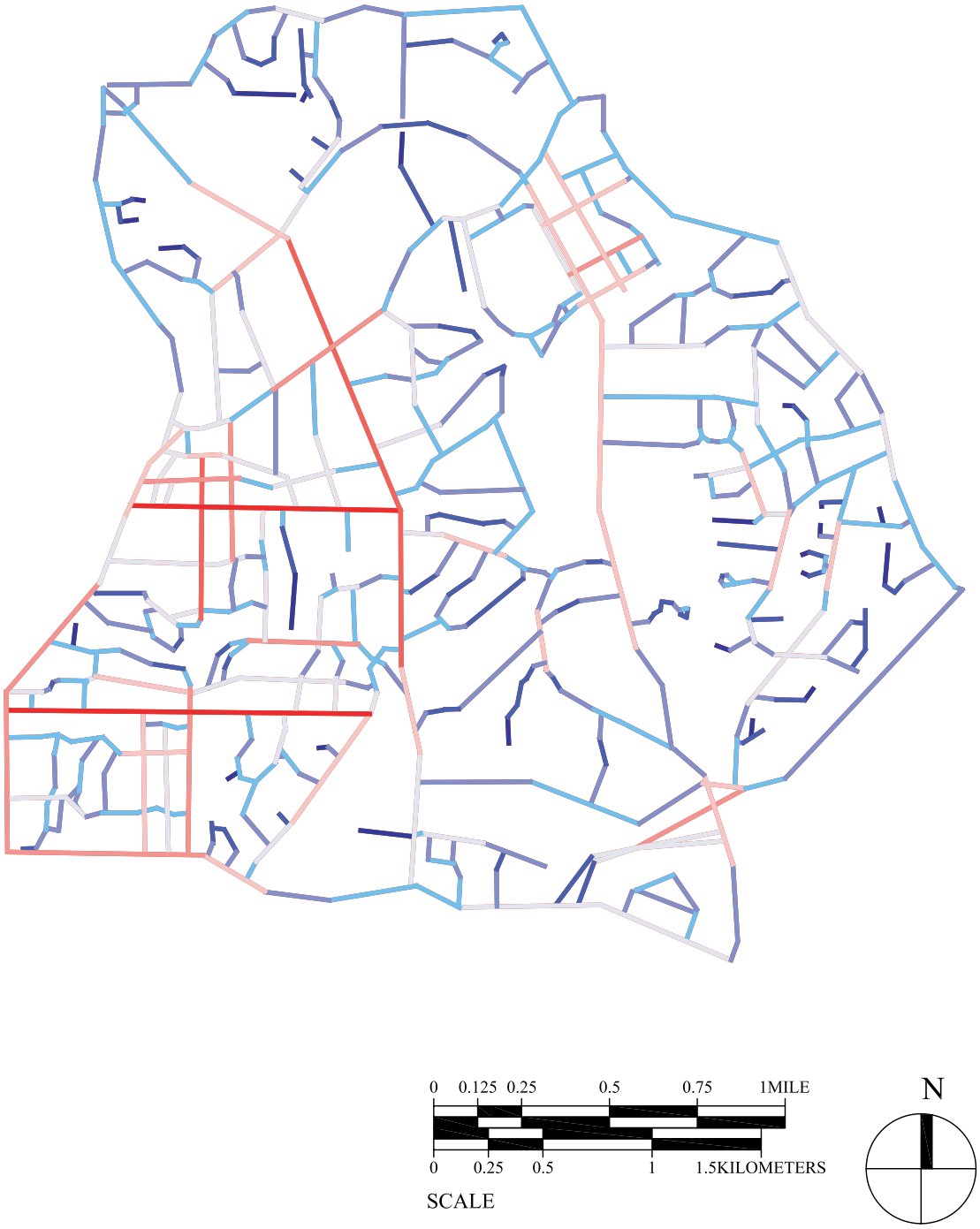


Figure 3.9 Local Integration Map of the Study Area in Buckhead, 1992

Figure 3.10 Local Integration Map of the Study Area in Buckhead, 1998

Figure 3.11 Local Integration Map of the Study Area in Buckhead, 2004

Figure 3.12 Global Integration Map of the Study Area in Buckhead, 1951

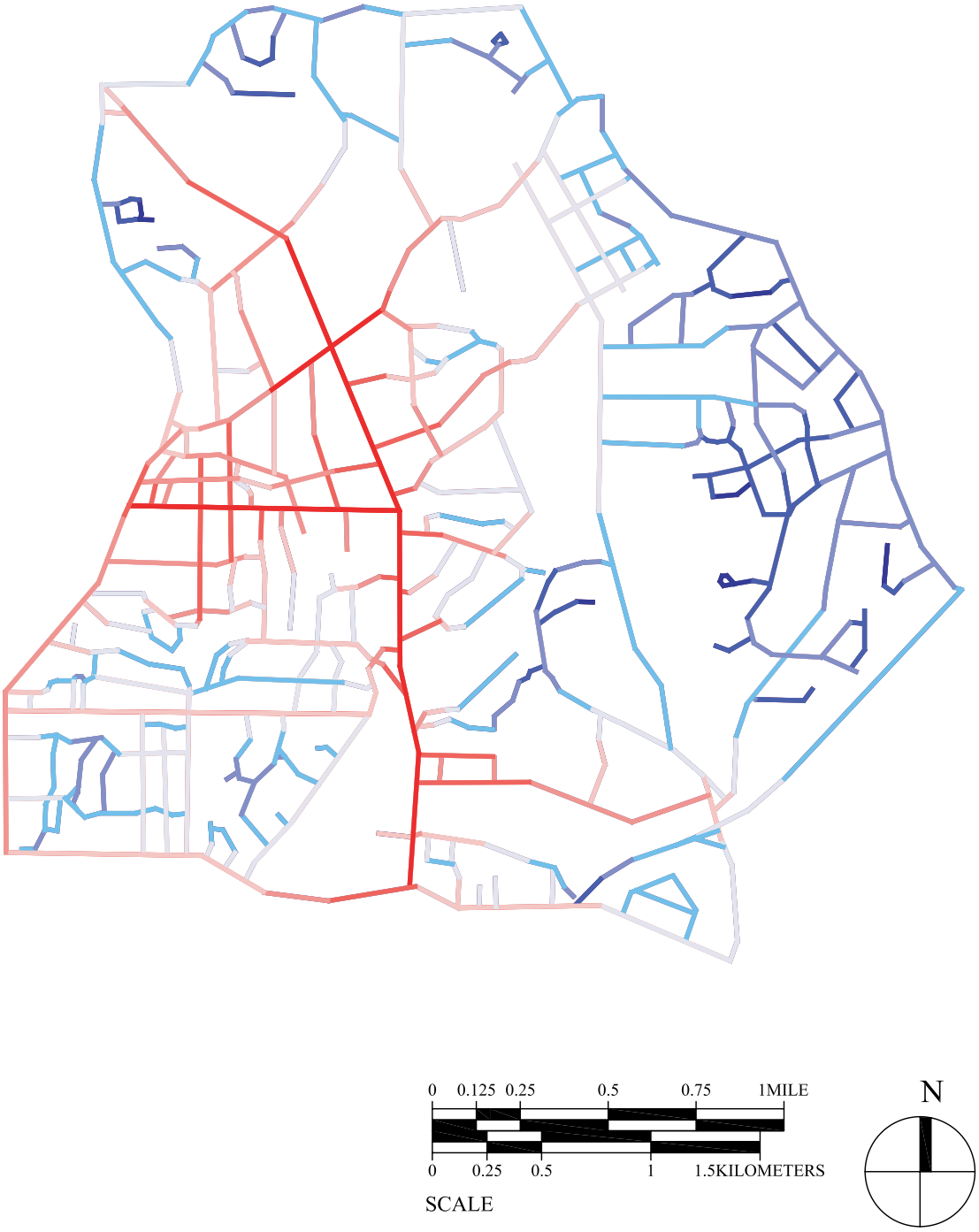


Figure 3.13 Global Integration Map of the Study Area in Buckhead, 1963

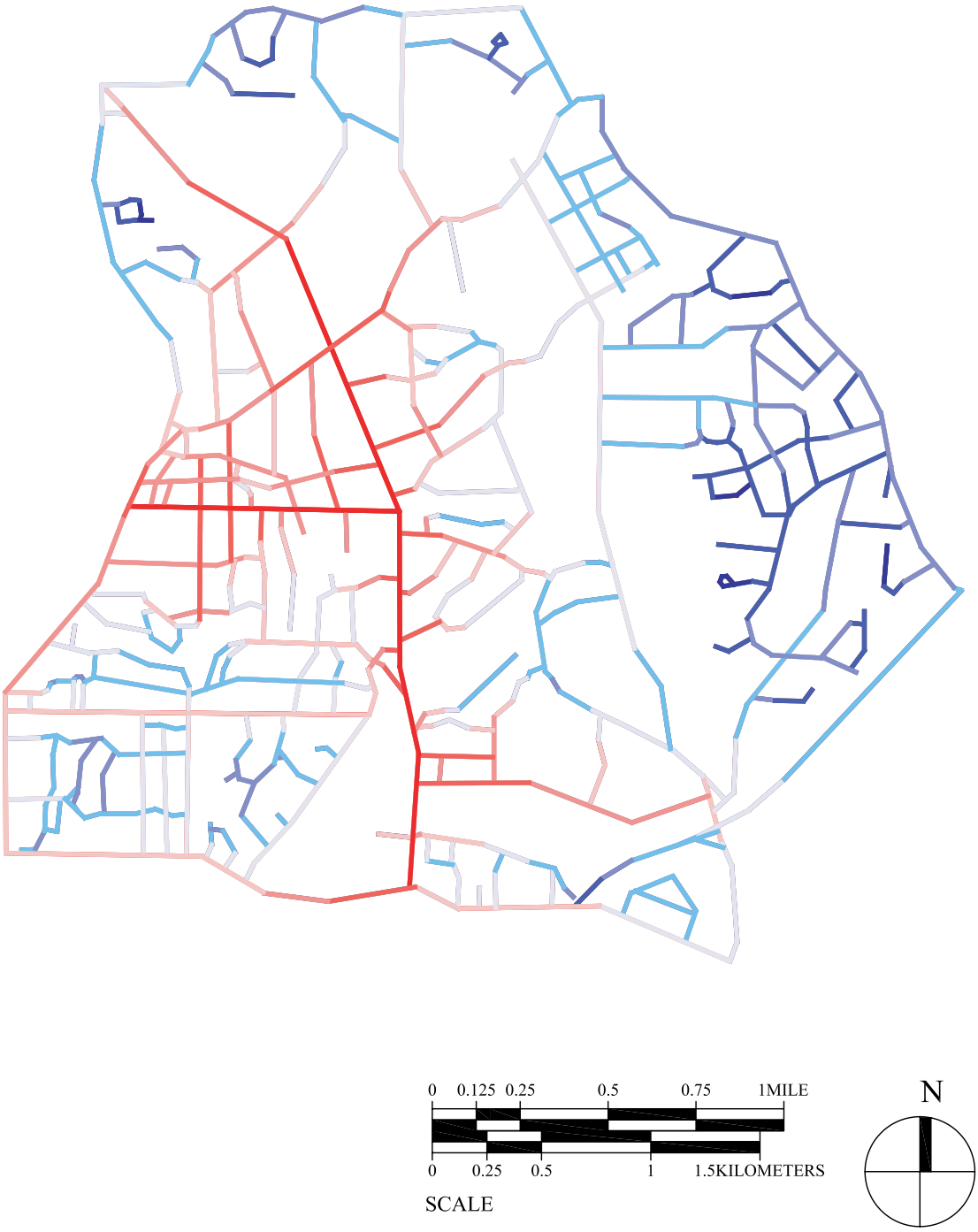


Figure 3.14 Global Integration Map of the Study Area in Buckhead, 1971

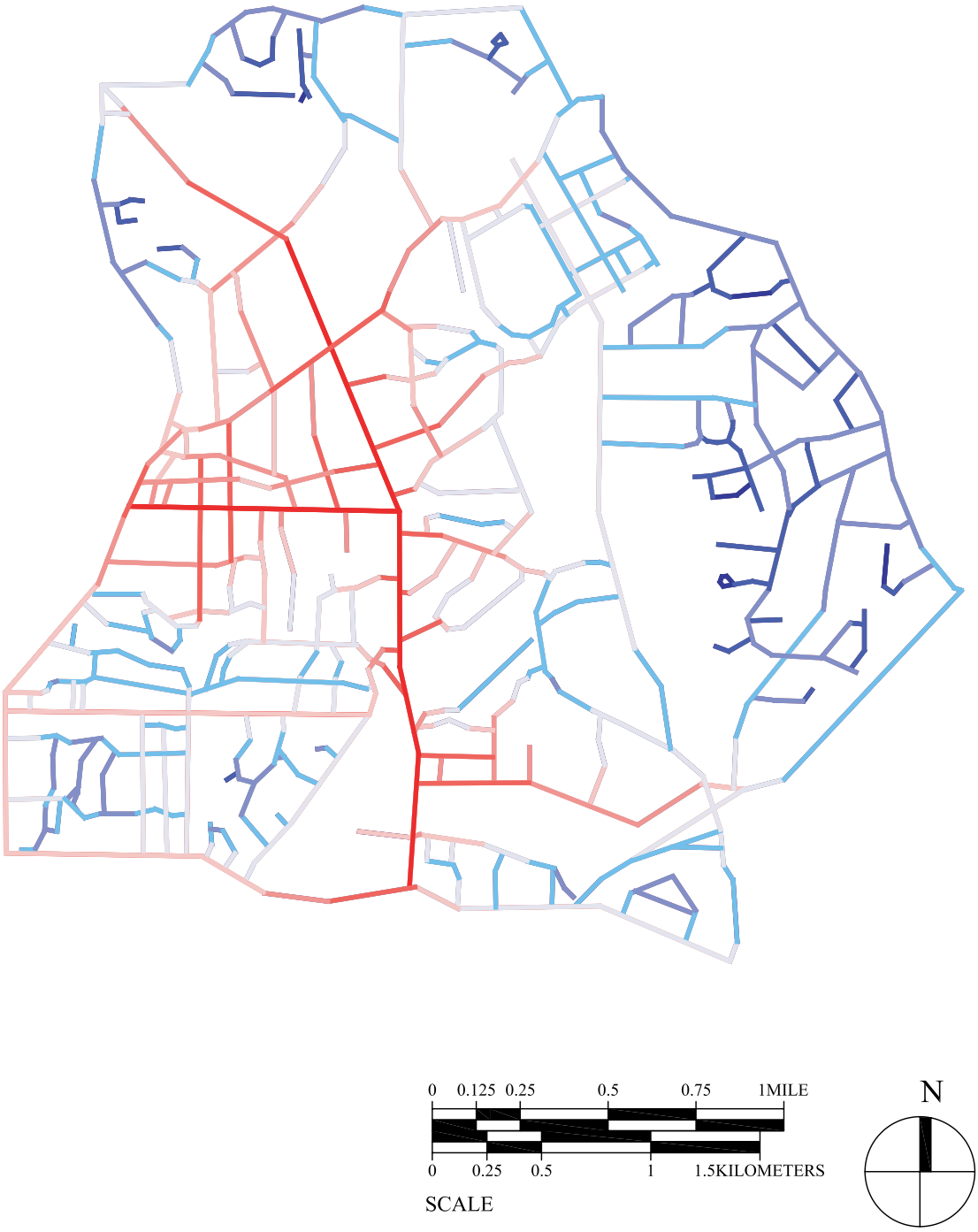


Figure 3.15 Global Integration Map of the Study Area in Buckhead, 1982

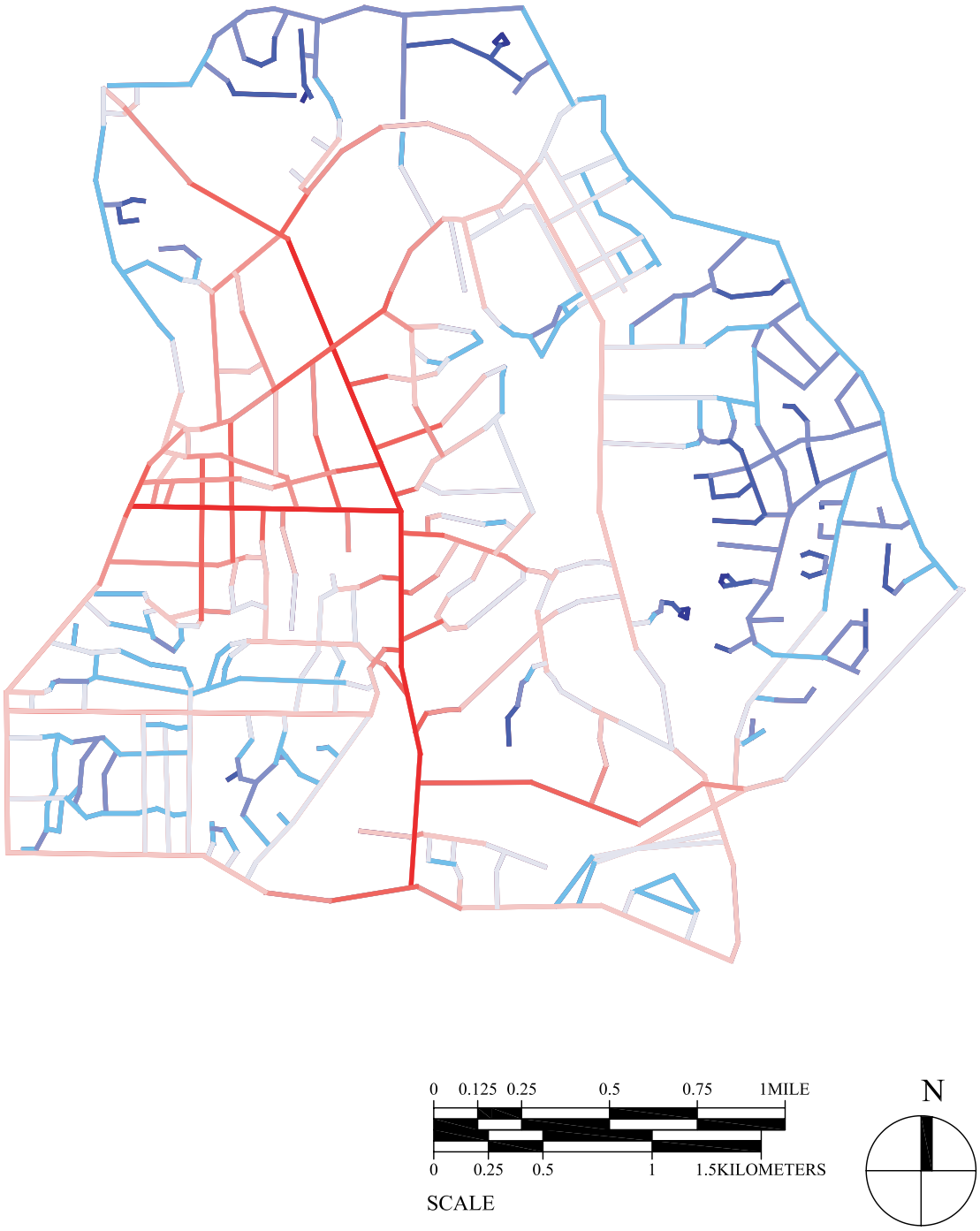


Figure 3.16 Global Integration Map of the Study Area in Buckhead, 1992

Figure 3.17 Global Integration Map of the Study Area in Buckhead, 1998

Figure 3.18 Global Integration Map of the Study Area in Buckhead, 2004

in a system) but higher directional distance (Dv) (Directional Distance measures the number of direction changes that are necessary, on average, in order to get to all streets within reach, from every road segment in a system) compared to Downtown, which indicates Buckhead has a more fragmented and less dense street network (Peponis et al. 2007b). The map series presented here demonstrates the curvilinear and irregular street system of Buckhead. This system acts like a framework which constrains the possible growth patterns.

The statistics depict the changes in the streets. Table 3.3 shows that the total street length increased from 50.77 miles (81.71 kilometers) in 1951 to 78.11 miles (125.71 kilometers) in 2004. That is, more than one half (53.85%) of the streets were added during the period of urban development. There are periods when street development accelerated—from 1951 to 1963 the total street length increased 25.37% when the area started to be developed and from 1992 to 1998 the total street length increased another 11.73% when GA 400 constructed. Additionally, the figure also expresses the 106.40% increase in line number from 328 in 1951 to 677 in 2004. But the

Table 3.3 Metric Properties of the Study Area from 1951 to 2004

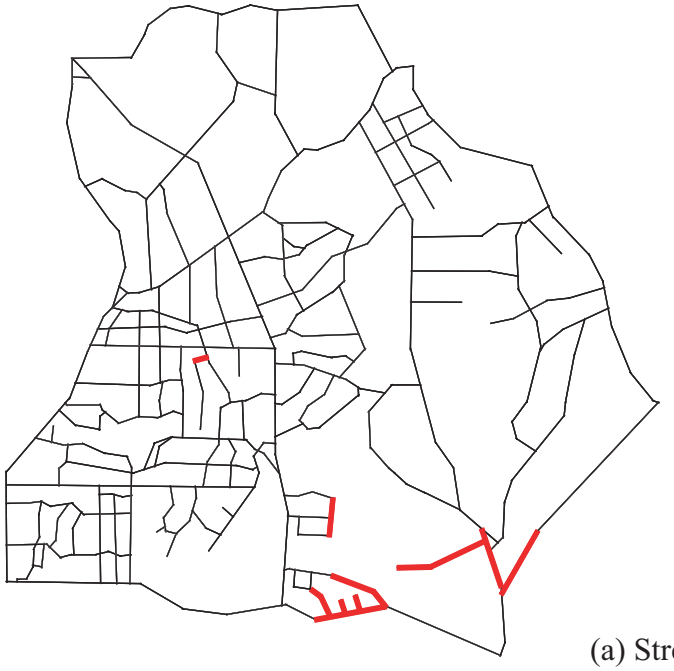
Year	Number of Lines	Total Street Length (Ft)	Total Street Length (Mile)	Average Street Length (Ft)	Street Changes	Average Block Size (Sq. Ft.)	Average Block Size (Acres)
1951	328	268,043.17	50.77	767.36		1,346,229.05	30.91
1963	507	336,045.14	63.64	612.91	29	964,570.66	22.14
1971	511	339,071.18	64.22	613.64	5	937,399.66	21.52
1982	510	345,331.43	65.40	627.22	7	962,600.13	22.10
1992	533	351,291.96	66.53	609.18	13	1,020,076.44	23.42
1998	598	392,500.57	74.34	606.44	9	987,190.92	22.66
2004	677	412,398.06	78.11	559.23	11	951,806.17	21.85

average length of a line decreased from 767.36 feet (233.89 meters) in 1951 to 559.23 feet (170.45 meters). The increase in axial lines and the decrease in average line length during the evolution mean more short lines were added into the spatial system, which confirms Peponis' findings (Peponis et al. 2007b). This indicates that more linearly fragmented and curvilinear street systems were evolving during the urban growth.

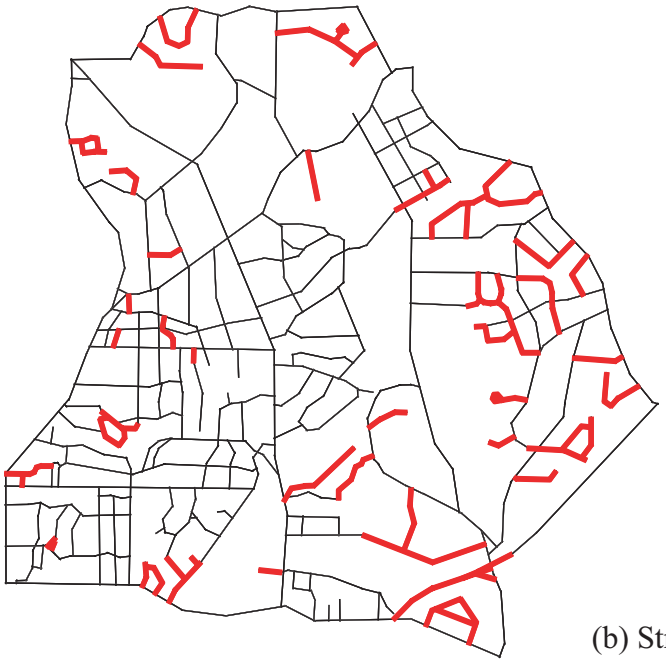
In order to examine the street changes thoroughly in the evolutionary process, street changes were traced in every period. The color red is used to highlight the streets that were changed (Figure 3.19 to Figure 3.24), either added, removed or adjusted, from each "start" point (a in figures) to each "end" point (b in figures). As shown in Table 3.3, some main points must be addressed.

First, the most street changes occurred during the period 1951 – 1962 which is consistent with the most street length increase. This is expected, given the history of urban development outlined earlier.

Second, there were significant numbers of street changes between 1982 - 1993 when GA 400 was being built and the Buckhead Loop opened. The Buckhead Loop created the local path between two spine streets, Peachtree Road and Piedmont Road, and increased the interconnection within the system. Accordingly, certain streets around it were adjusted. One result was the disconnection of Ivy Road and Stratford Road from the rest of the spatial network. Thus, the newly constructed loop created a local disconnection and framed the boundary between the residential and mixed-use lands. This point will be confirmed by further study of the land use patterns in a later discussion.

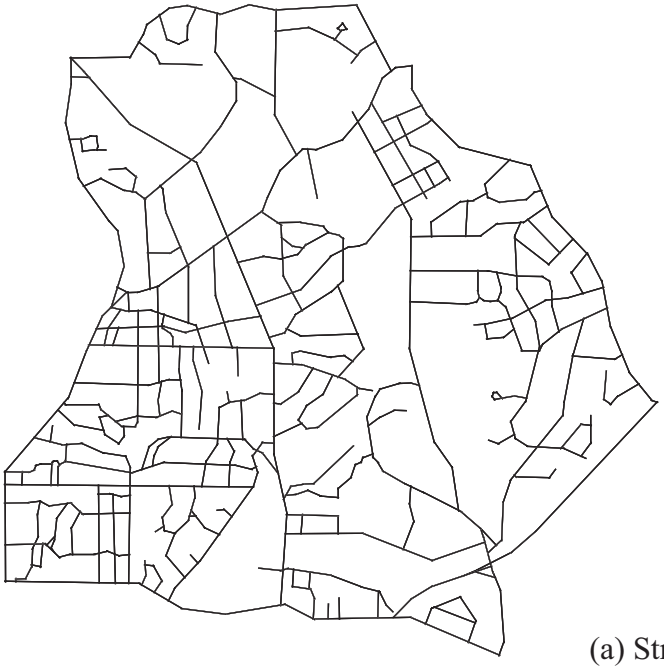


(a) Street Map in 1951

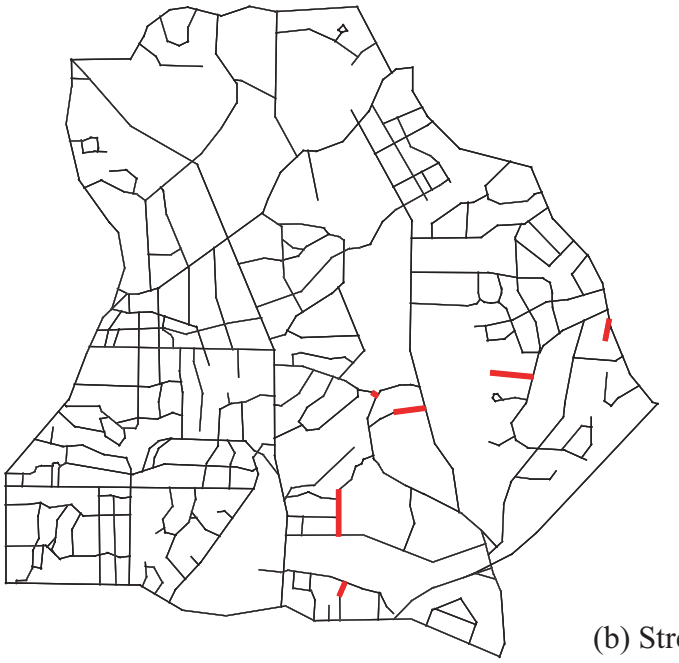


(b) Street Map in 1962

Figure 3.19 Street Changes in the Study Area from 1951 to 1963

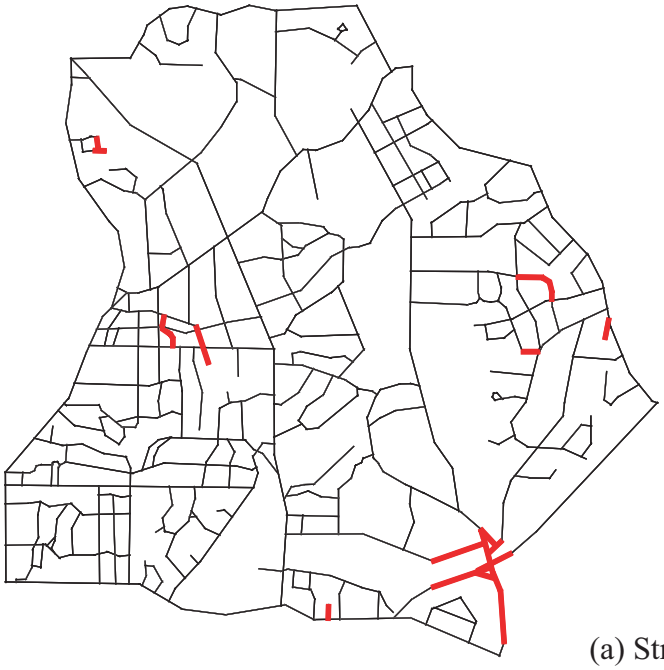


(a) Street Map in 1963

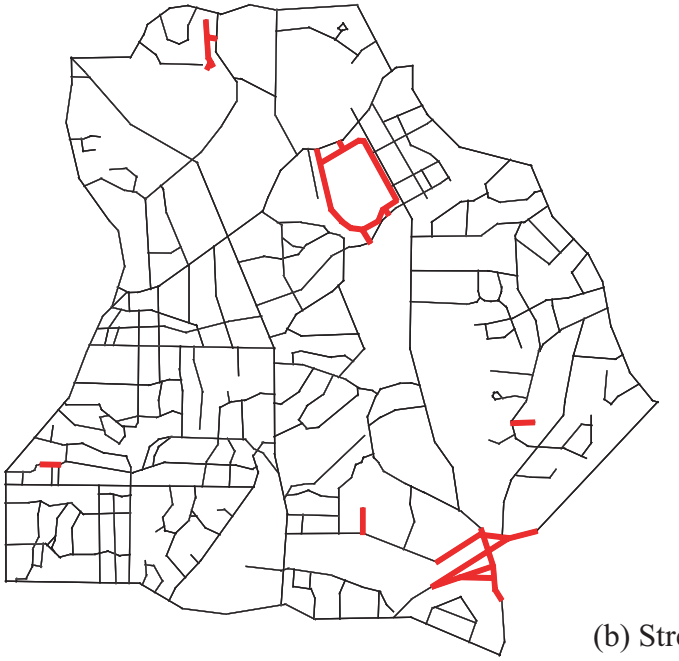


(b) Street Map in 1971

Figure 3.20 Street Changes in the Study Area from 1963 to 1971

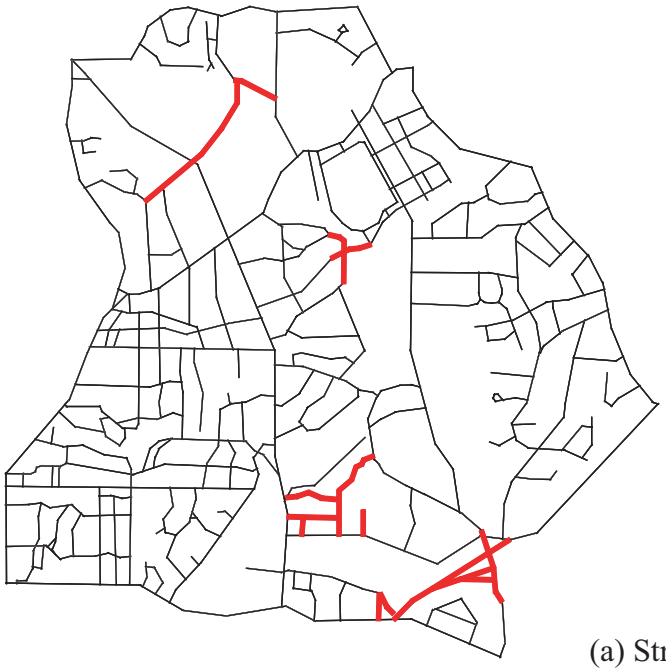


(a) Street Map in 1971

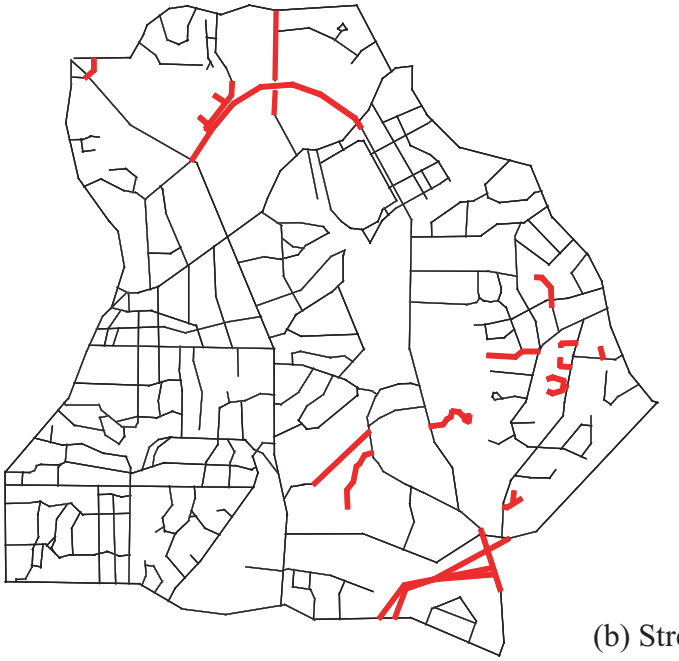


(b) Street Map in 1982

Figure 3.21 Street Changes in the Study Area from 1971 to 1982



(a) Street Map in 1982



(b) Street Map in 1992

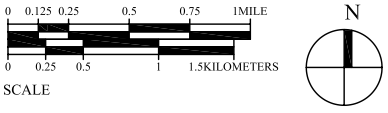
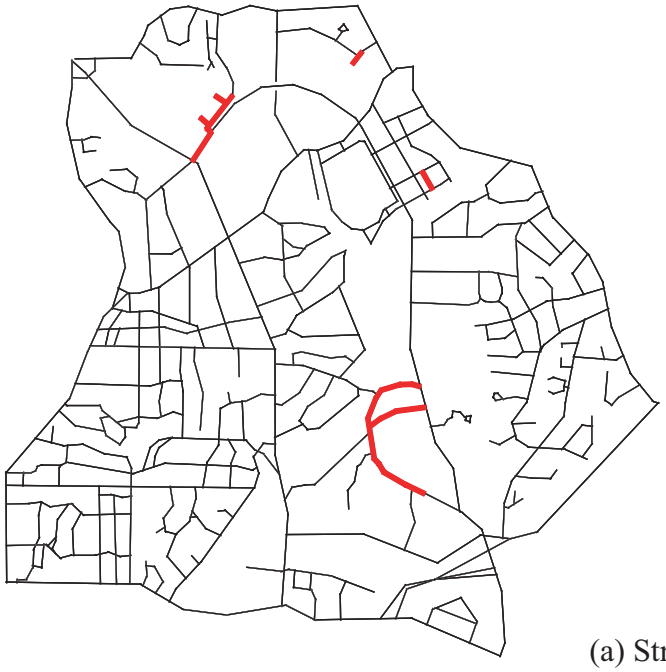
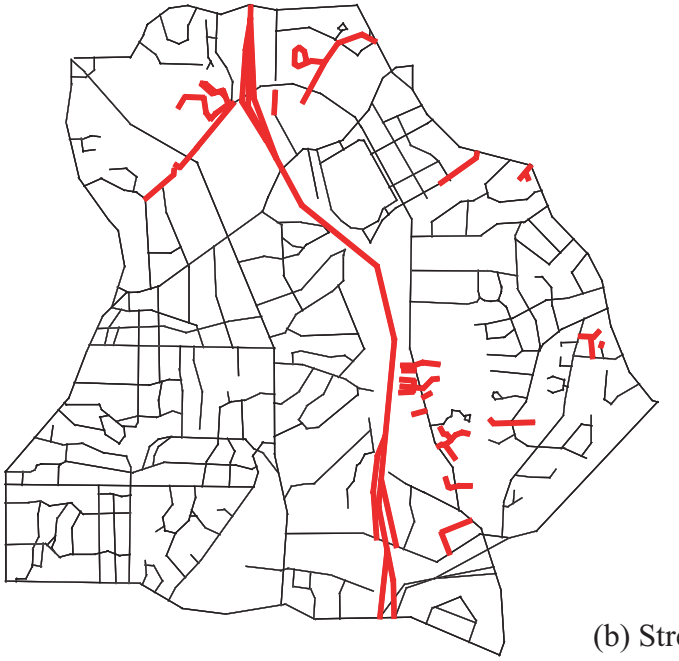


Figure 3.22 Street Changes in the Study Area from 1982 to 1992



(a) Street Map in 1992



(b) Street Map in 1998

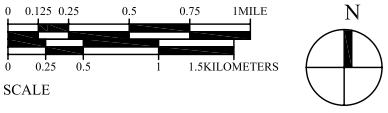
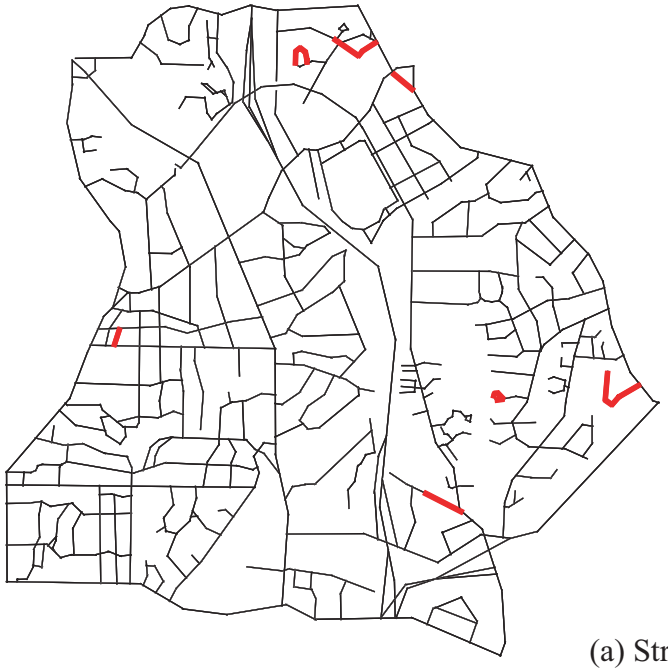
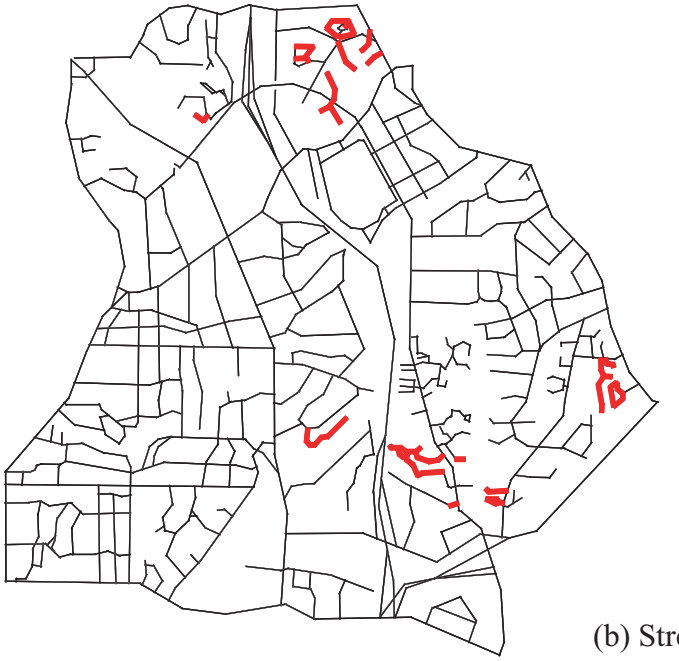


Figure 3.23 Street Changes in the Study Area from 1992 to 1998



(a) Street Map in 1998



(b) Street Map in 2004

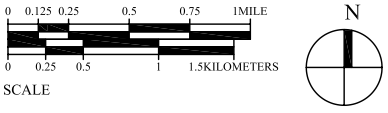


Figure 3.24 Street Changes in the Study Area from 1998 to 2004

Third, and most importantly, critical changes occurred after the opening of GA 400. The planning of GA 400 started in 1954 and was officially dedicated in 1971. The section passing through the Buckhead area (between I-285 and I-85) was the last one constructed. After numerous years' lawsuits filed by the opposing residents against United States Department of Transportation and Georgia Department of Transportation (GDOT),[5] the construction of this section started in 1990. The highway was finally opened in 1993. According to the historic literature (Atlanta Region Metropolitan Planning Commission 1960, 14-18), the proposed plan (Figure 3.25) intended to create both expressway and boulevard systems to improve the worsening traffic accompanying the growth of Buckhead. The plan was only partially implemented. But the major goals of GA 400 (then named "Peachtree Connector – North Fulton Expresseay") were the same:

1. Relieve the traffic pressure on Piedmont Road, Roswell Road, and Peachtree Road, which were the carriers of north-south through-traffic.
2. Provide better global connection to the midtown and downtown areas from the heart of Buckhead, shorten the commuting time between those places, and improve the global accessibility to Buckhead.
3. Expand the existing business district and create an efficient connection to the street system within the area.

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[5] The most famous case is *North Buckhead Civic Association v K. Skinner E N M*. The defendants include Samuel K. Skinner, as Secretary of the United States Department of Transportation; Robert E. Farris, as Administrator of the Federal Highway Administration; Hal Rivers, as Commissioner of the Georgia Department of Transportation; and Metropolitan Atlanta Rapid Transit Authority (MARTA). The case detail is at http://openjurist.org/903/f2d/1533.

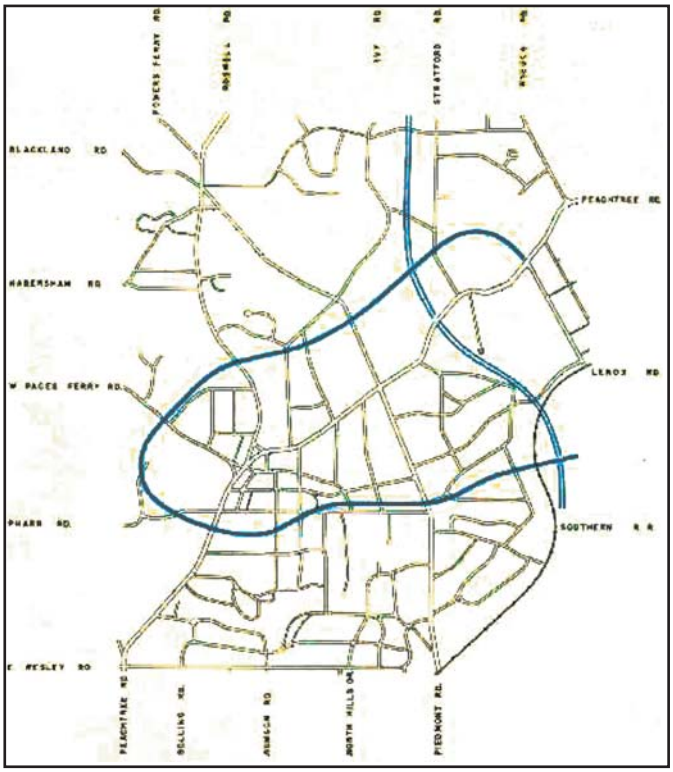


Figure 3.25 Proposed Expressway and Boulevard System at Buckhead, 1960
(Map Source: Atlanta Region Metropolitan Planning Commission 1960, 18)

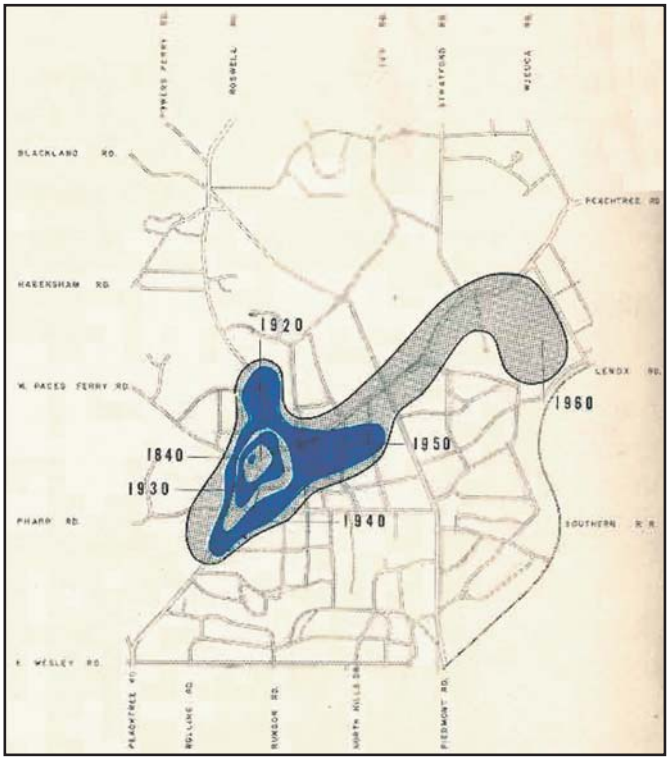


Figure 3.26 Generalized Growth of the Business District at Buckhead from 1840 to 1960
(Map Source: Atlanta Region Metropolitan Planning Commission 1960, 11)

Although intended to increase global connection, the construction and opening of GA 400 caused the reduction of local interconnections. Despite the construction of the Buckhead Loop, more streets—East Paces Ferry Road (see Figure 3.22 a), Burk Road, and Canterbury Road (see Figure 3.23 a))—were disconnected by GA 400. The disconnection made east-west through traffic more difficult, leaving only two accesses—the Buckhead Loop and Sidney Marcus Boulevard—within 2.5 miles. Thus, the critical changes in the street framework during the urban evolution in Buckhead were intended to increase its global connection but lead to local disconnection. This will be confirmed by syntactic analysis in a later discussion.

Framed by streets, the block is the basic unit of urban layout. The changes in blocks within the area, such as block number, block size and density are then examined. Based on the increase in the number of streets during the urban evolution, an increase in blocks may be expected. As shown in Table 3.3, although there were some changes during certain periods, generally there is no consistent trend of increasing numbers of blocks or decreasing block size since 1963.

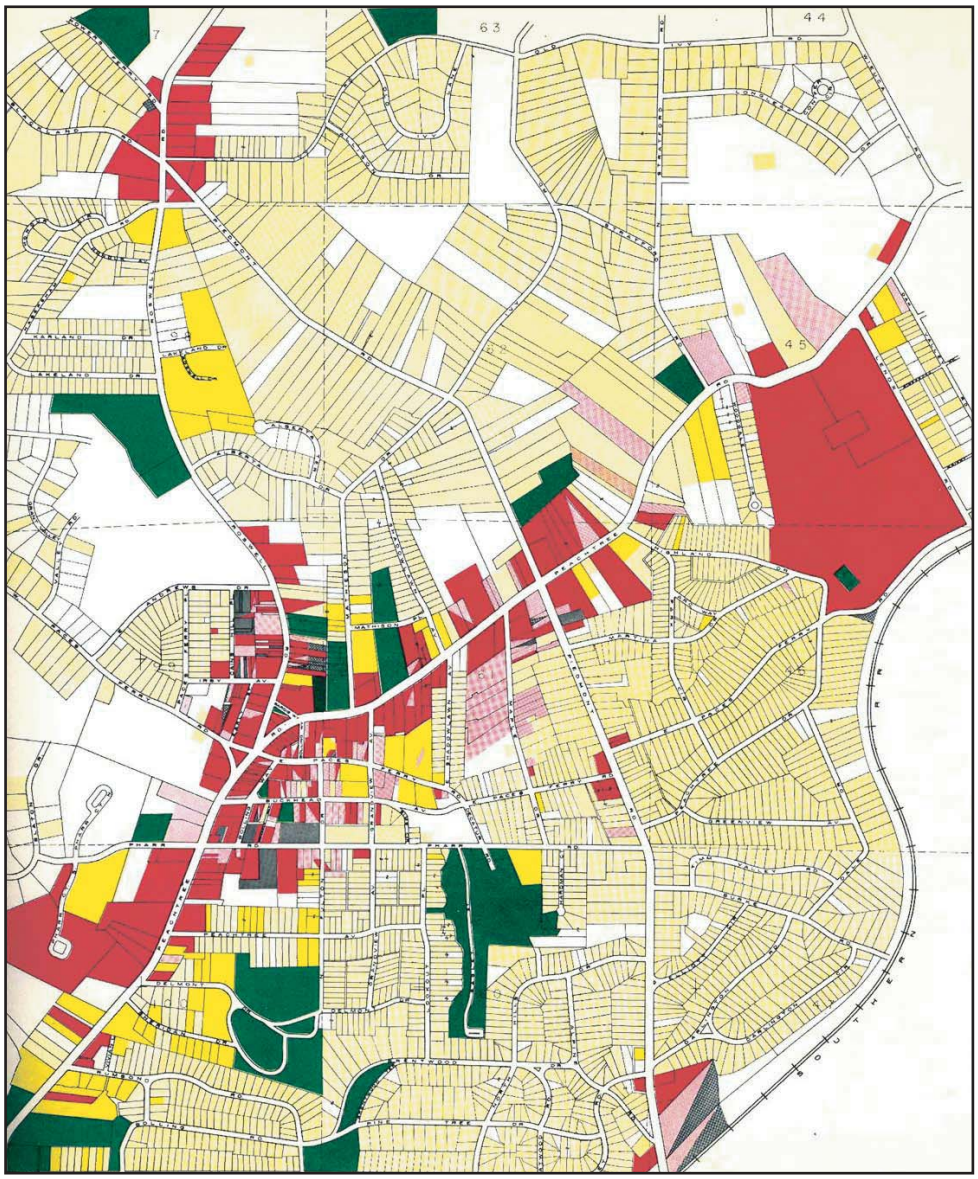
Exploring the maps of the area during the process of urban evolution, several reasons were identified for this apparent conflict. Most of the added streets were cul-de-sacs which did not to break down the original blocks into smaller ones but only created accesses to the inside of the blocks. There are examples within the mall blocks and Pine Hills neighborhood as well. This led to the contradictory fact that although there were more streets constructed, there were almost no increase in block numbers and density. Cul-de-sacs do not add blocks. They make block perimeters more irregular.

Thus, based on above analysis, the conclusion is that the newly added streets during the evolutionary process were linearly fragmented, and they did not intensify blocks in the public domain, which indicates cul-de-sacs were created as paths to the interior of the block. The new city keeps a very similar regulatory framework during the evolutionary process.

3.4 Coexistence and Encroachment Within Land Use Patterns: Conflict and Reconciliation

During the entire process, the area primarily consisted of residence and commerce. In earlier years, Buckhead's business district originated from the traditional triangle, and then spread out through Peachtree Road until the construction of Lenox Square (Figure 3.26). Until the 1960s, the business district resembled a dumbbell with two hubs, the traditional triangular district and the Lenox Square – Phipps Plaza district, connected by Peachtree Road. This set up the foundation for the coexistence of different land uses in Buckhead.

Since then, how did the land use pattern evolve? Four land use maps were collected for the study area (Figure 3.27 to Figure 3.30). Two were created in 1960, the original point of urban development in the area. Two were created recently, in 2001 and 2008, the current point of urban development. Among them, two are the existing conditions at 1960 and 2001; and the other two are the proposed plan at 1960 and 2008. These four maps supply us with interesting comparison documents from multiple perspectives. They show not only the changes and dynamics in the land use patterns in the evolution, but also the discrepancies between the real situations and the proposed



LEGEND

- Commercial - Retail
- Commercial - Office
- Residential - Multi-family
- Residential - Single Family
- Public and Semi-Public
- Industrial and Wholesale

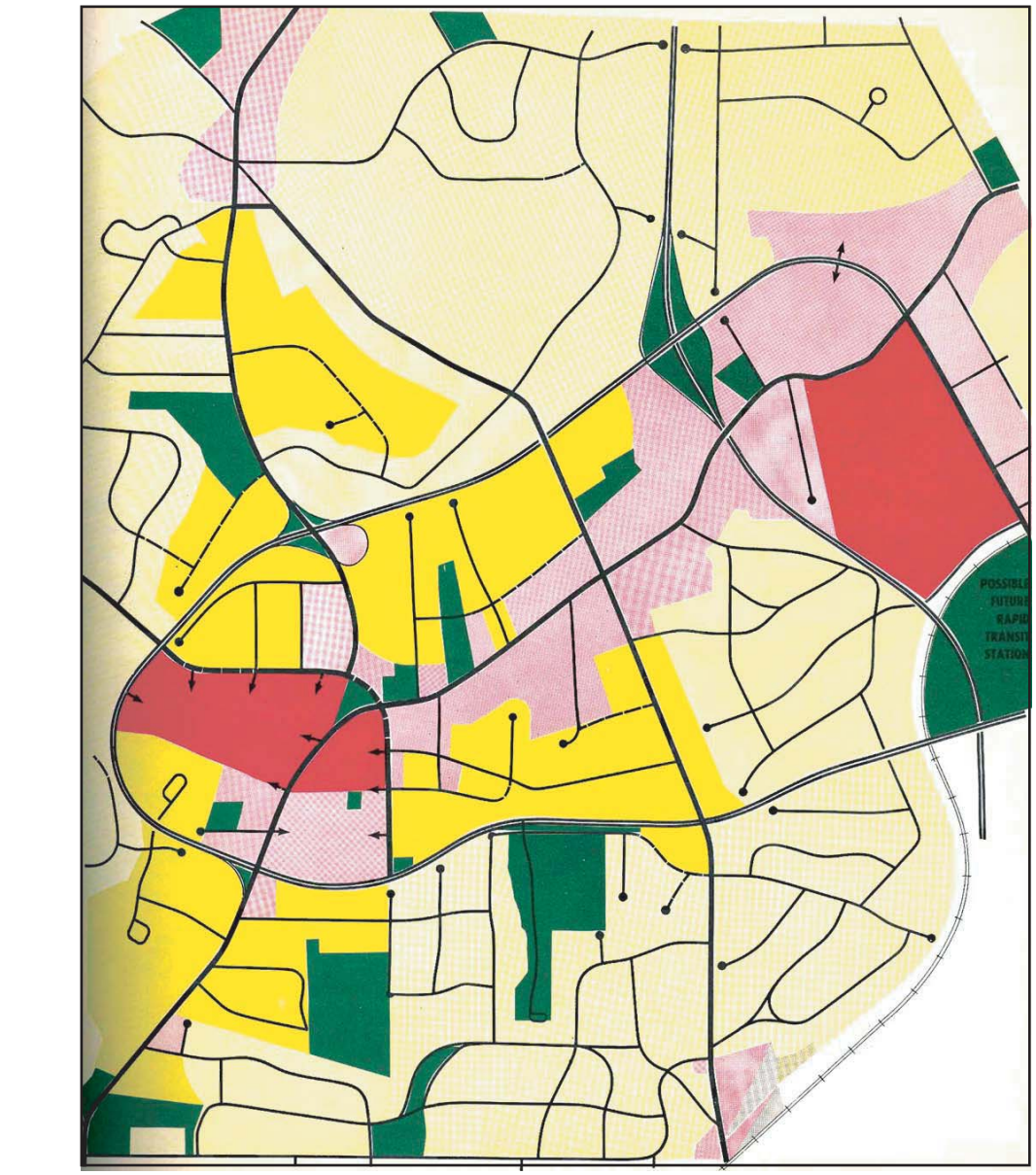
0 500 1000 2000 3000 4000FEET

0 200 400 800 1200METERS

SCALE

N

Figure 3.27 Existing Land Use Map, Buckhead, 1960
(Map Source: Atlanta Region Metropolitan Planning Commission 1960, 7)



LEGEND

- Commercial - Core
- Commercial - Other
- Residential - Multi-Family
- Residential - Single Family
- Public and Semi-Public
- Light Industrial

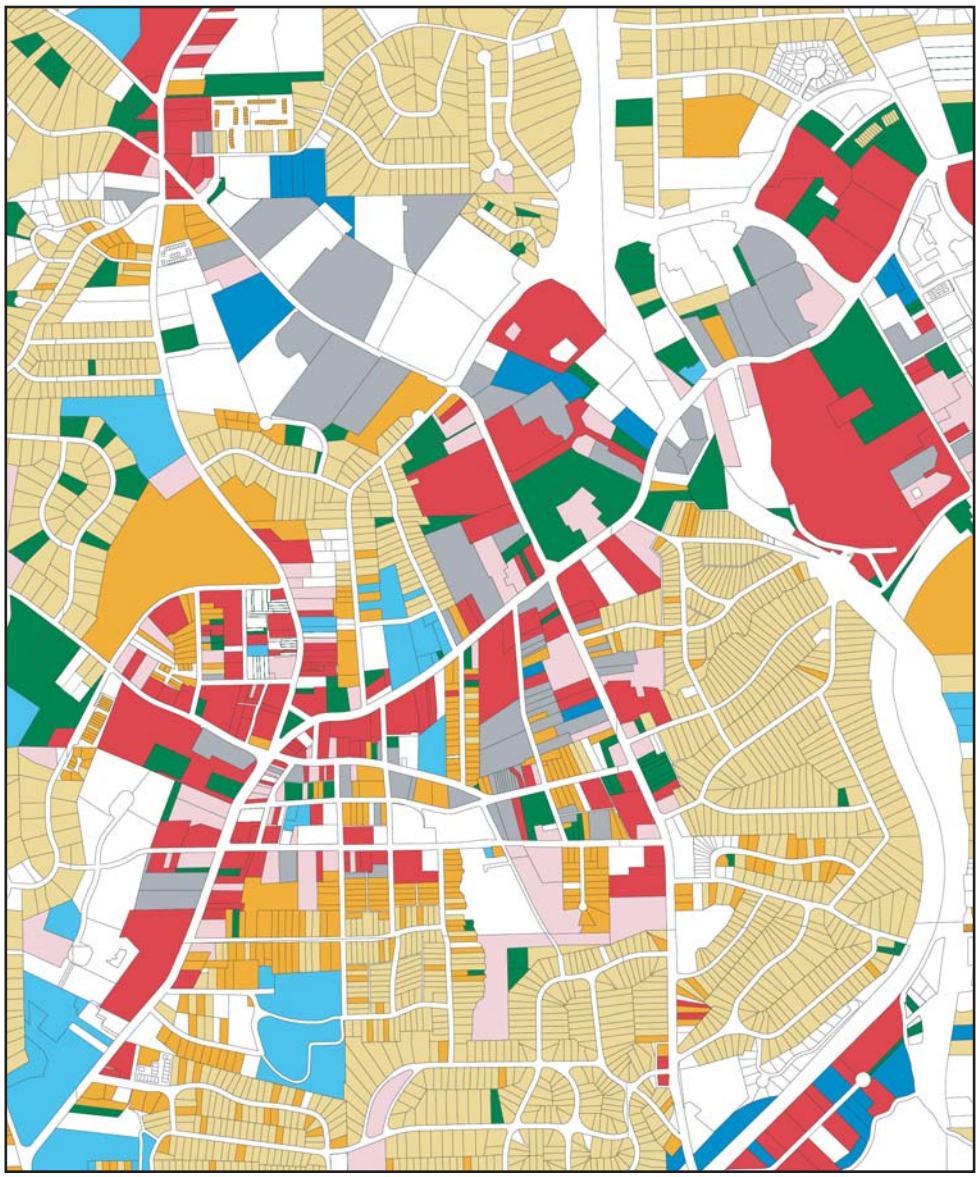
0 500 1000 2000 3000 4000FEET

0 200 400 800 1200METERS

SCALE

N

Figure 3.28 Proposed Land Use Map, Buckhead, 1960
(Map Source: Atlanta Region Metropolitan Planning Commission 1960, 17)



LEGEND

- Commercial
- Recreational
- Multi-Family Residential
- Single Family Residential
- Unknown
- Office
- Institution
- Industrial
- Open Space / Vacant

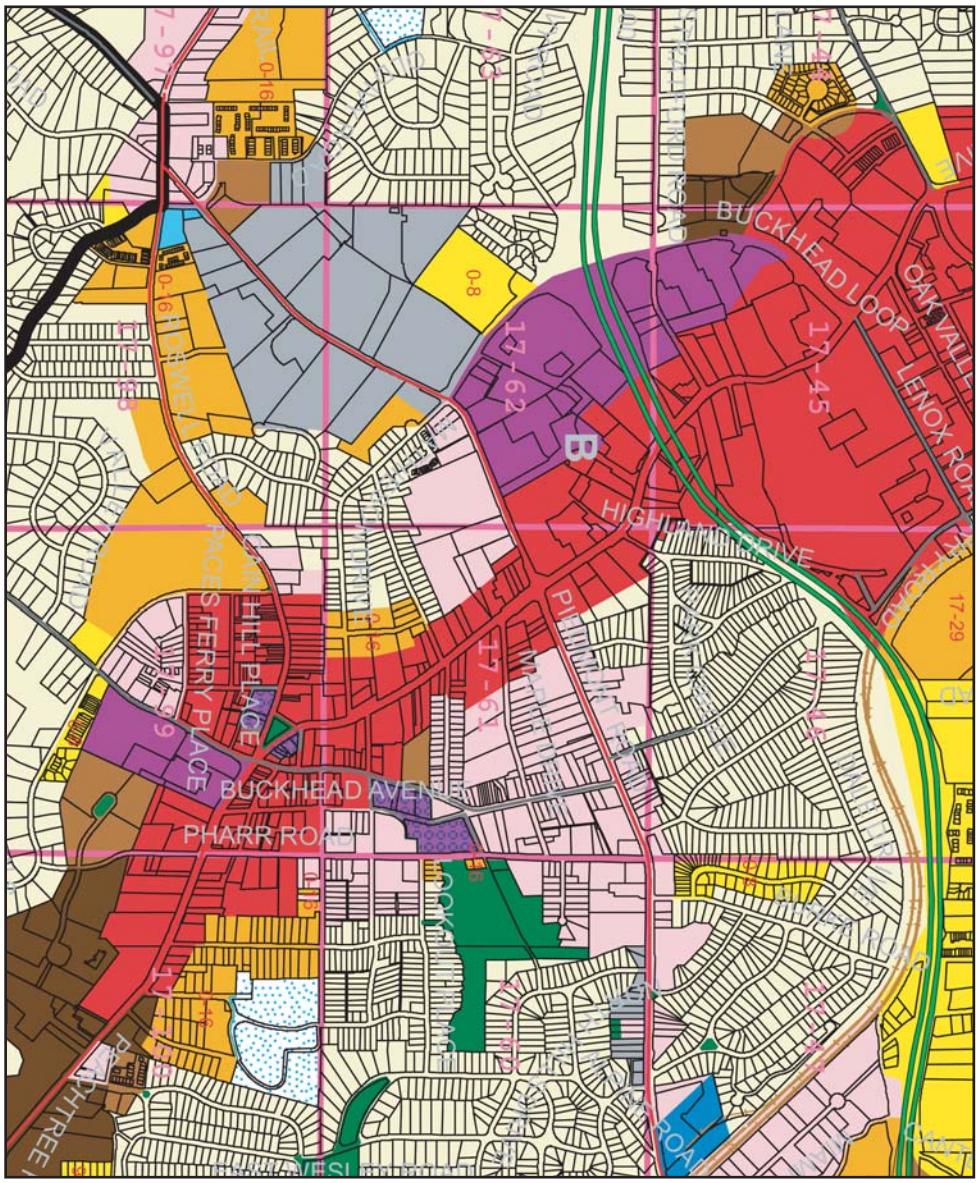
0 500 1000 2000 3000 4000FEET

0 200 400 800 1200METERS

SCALE

N

Figure 3.29 Existing Land Use Map, Buckhead, 2001
(Map Source: Georgia Institute of Technology GIS Center 2001)



LEGEND

- High Density Commercial
- Low Density Commercial
- Very High Density Residential
- High Density Residential
- Medium Density Residential
- Low Density Residential
- Single Family Residential
- Mixed Use
- Office/Institution
- Office/Institution/Residential
- Industrial
- Open Space
- Community Facility

0 500 1000 2000 3000 4000FEET

0 200 400 800 1200METERS

SCALE

N

Figure 3.30 Proposed 15 Year Future Land Use Map, Buckhead, 2008
(Map Source: City of Atlanta Planning and Community Development Website)

plans, which indicates a conflict and reconciliation process between public and private interests.

Studying the maps, urban development of commercial buildings and office buildings were seen encroaching mainly along Piedmont Road and West Paces Ferry Road, and then spreading out. The growth pattern actually conflicts with the proposed plan in 1960, which shows only commercial use for the Peachtree-Piedmont corner and residential use for other areas along Piedmont. This is one typical example of spatial conflict when residence and commerce coexisted and competed with each other during the urban growth. Then, the 2008 proposed land use map for the next 15 years shows all commercial areas along Piedmont and West Paces Ferry. Another example can be seen in the 1960's proposed plan. Here, clearly there is a boundary, the proposed boulevard cutting through the Tower Place block, between residence and commerce. But this boundary was broken during the development process, and it was pushed back to the Buckhead Loop in the 2008 proposed plan. The 2001 case of *The City of Atlanta v TAP Association* explicitly displayed the conflict between different land uses, and public and private interests. The developer wanted to change the zoning for a single-family residential property (9.35 acres) in North Buckhead and use it for commercial and high-density residential buildings. The Georgia Supreme Court rejected the developer's argument, and protected the existing neighborhood from high density and commercial use.[6]

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[6] The detail of the case is at "Georgia Court Upholds Atlanta Comprehensive Plan Zoning." *Planning,* May 2001, 4.

This suggests urban growth is the process of commercial area encroachment and traditional residential area recession. Negotiation and reconciliation becomes a necessary part in the process. One way to reconcile it is to make some surrounding land available for high or medium density residences, which is exactly what is shown in both the 1960 and 2008 proposed plans, and to ensure enough residential space during the huge commercial developments.

Based on the analysis above, under a similar constraining framework, the land use pattern changes suggest the dynamics would occur inside the block, such as reconfiguring the land subdivisions, and create the internal circulation system to access buildings. During the urban evolution, in some larger blocks which were usually commercial or mixed-use lands where new developments were emerging, in order to have access to interior buildings and maximize land value, secondary functional internal roads connecting the outside street and the inside of the block needed to be created. Consequently, this kind of secondary internal road produced the “frontage road” to create an intimate business atmosphere for attracting patrons passing through it, and making the land economically valuable despite the large block. The secondary internal accesses and the resulting block fragmentation usually happen inside the block and are in the private domain. This essential property determines how the private interests of land owner play a critical role in the formation of buildings, circulation system, and other latent form elements. The underlying conflicts between different ownerships make the reconciliation necessary in urban development. Both interact with other factors to create the mechanism of urban growth for new cities.

3.5 Dynamics of Syntactic Patterns

Pursuant to the *Space Syntax* method, the axial maps were reconstructed and calculated (Figure 3.5 to Figure 3.18, Table 3.4). The axial maps and syntactic table were analyzed with several goals in mind. First, the most integrated lines and the integration core had to be identified, both locally and globally. Based on the theory of Hillier's natural movement economy (Hillier 1996, 111-137), these places were predicted to have the most movements and be the concentration of activities and functions. Second, the changes of integration patterns, especially after construction of some streets such as the Buckhead Loop and GA 400, had to be identified. Third, the changes in syntactic patterns with the real changes in urban fabric during the evolution had to be associated.

Table 3.4 Syntactic Properties of the Study Area from 1951 to 2004

Year	Mean Depth R(3)	Mean Depth R(N)	Mean Real_Int. R(3)	Mean Real_Int. R(N)	Mean Conne-ctivity	Corr. Re_Int. R(3) vs. Re_Int. R(N)	Corr. Conn. vs. Re_Int. R(N)
1951	1.640	9.643	1.617	0.701	2.707	0.545	0.412
1963	1.630	11.858	1.590	0.614	2.675	0.481	0.350
1971	1.633	11.680	1.600	0.624	2.685	0.458	0.339
1982	1.633	11.507	1.604	0.633	2.698	0.489	0.371
1992	1.626	12.213	1.562	0.597	2.645	0.490	0.371
1998	1.624	12.947	1.545	0.575	2.622	0.510	0.381
2004	1.616	13.576	1.507	0.560	2.576	0.524	0.400

(Note: All correlations are significant at 0.001 level (2-tailed).)

The local integration maps (Figure 3.5 to Figure 3.11) mainly proved two things. First, the local cores were stable. Second, they were disconnected. Different local cores do not have integrated lines to interconnect with each other. This indicates that

Buckhead is an assemblage of areas with distinct hubs. These hubs do not flow into one another. From the maps, three local integration cores can be seen: one is in the traditional triangle area; one is along Lenox Road near the Lenox Square block; and one is along East Wesley Road. They are disconnected with each other. That pattern keeps coherent in the later urban fabric. Looking at the land use maps (Figure 3.25 and Figure 3.27), it can be seen that the first two areas are also concentrated with commercial lands.

For global integration maps (see Figure 3.12 to Figure 3.18), the key trend is towards a more distributed core, and the red colored lines, that is, those with high integration value, are spreading out over the whole system. The second trend is a shift from an emphasis around the traditional Buckhead triangle to a new emphasis around the Peachtree – Buckhead Loop intersection. The 1951 map shows that the most integrated lines focused on Piedmont Road and Pharr Road. Then, the later maps show that the original integration core which used to focus on the western part along Piedmont Road became spread out to the eastern part as well as along Lenox Road, especially after construction of the Buckhead Loop. Lenox Road became one of the most globally integrated streets within the system, which achieved its goal of alleviating traffic jams in the Buckhead area according 1960 report (Atlanta Region Metropolitan Planning Commission 1960, 14-18). The land use maps (Figure 3.27 and Figure 3.29) show similar dynamics in land use pattern changes and the encroaching process of commercial areas.

When local and global integration maps are taken together, a two-level logic emerges. An increasingly distributed global integration pattern is superimposed on a more stable and fragmented local integration pattern. The traditional triangle area was

the origin point of the entire Buckhead area, and is proven to have both global and local cores. During the urban evolution, the global core was distributed after the construction of Buckhead Loop connecting Piedmont and Lenox Roads. The trend was strengthened after the opening of GA 400. The original unequal integration pattern which was more focused on the west side of Piedmont became balanced to a certain degree. The dynamic pattern suggests that the global integration core can be fluid by the integrated lines. At the same time, the locally segregated Buckhead Loop and highway did not affect the local pattern. Moreover, the Tower Place block that was originally attached to the global integration core has moved gradually onto it. Locally, the core was always at the southern corner of the block, at the intersection of two key streets, Peachtree and Piedmont.

During the new urban growth, all three mean values of local integration (Real_Int. R(3)), global integration (Real_Int. R(N)), and connectivity drop slightly during the growth process (see Table 3.4), although the trend is not very consistent. This contradicts our expectation that more roads lead to a more integrated system. In order to clarify the issue, the mean values of unchanged streets during the development are compared. Looking at the table (Table 3.5), the mean values of the unchanged axial lines are kept while those that changed during each period were excluded. The unchanged lines were found to increase the values of local integration and connectivity, and they became more locally integrated. For instance, from 1951 to 1963, excluding those changed streets, the remaining streets had a higher local integration value (Real_Int. R(3)) and connectivity compared with those in 1951 (1.723 and 2.887 compared to 1.617 and 2.707). Yet there is one exceptional period, 1982 to 1992, when some major east-west local connections

Table 3.5 Syntactic Properties of the Unchanged Axial Lines During Each Period

Year	Line Number	Mean Depth R(3)	Mean Depth R(N)	Mean Real_Int. R(3)	Mean Real_Int. R(N)	Mean Conne-ctivity
1951	328	1.640	9.643	1.617	0.701	2.707
*1963	344	1.650	11.124	1.723	0.650	2.887
963	507	1.630	11.858	1.590	0.614	2.675
*1971	505	1.632	11.675	1.604	0.624	2.693
1971	511	1.633	11.680	1.600	0.624	2.685
*1982	481	1.634	11.504	1.605	0.633	2.696
1982	510	1.633	11.507	1.604	0.633	2.698
*1992	475	1.634	12.072	1.602	0.603	2.695
1992	533	1.626	12.213	1.562	0.597	2.645
*1998	505	1.632	12.660	1.602	0.585	2.711
1998	598	1.624	12.947	1.545	0.575	2.622
*2004	603	1.625	13.331	1.547	0.570	2.632
2004	677	1.616	13.576	1.507	0.560	2.576

(Note: * means keeping the unchanged axial lines and excluding changed lines during each period.)

were cut off due to GA 400. The result indicates that most of the changed streets during the urban evolution would be more segregated locally, and those streets would more likely be cul-de-sacs with steps away from the main streets leading into the block without interconnection with the rest of the system. Thus, new streets were poorly connected but still enhanced the connectivity of previous streets.

3.6 Discussion: A New City with Spatial Conflict and Spatial Dynamics

This chapter illustrates the urban evolutionary process of one typical American edge city—Buckhead—to see how a previous suburban area has developed into a current economic hub and a functional city.

During the process of turning a previous suburban residential area into a new functional center, the Buckhead area has been absorbed into the larger urban fabric and is no longer at the urban fringe geographically. The new city has certain obvious characteristics and many commercial developments that gather around them mixed use developments as well as traditional residential neighborhoods. This new metropolis form creates the opportunity for people to both live and work in the area.

The evolution of the street framework. The general curvilinear street framework and urban form has not changed much during the urban development process. The general street framework was determined before the area was developed. However, there are some specific changes based on the existing street framework. The major changes are the construction and opening of GA 400 and the Buckhead Loop, which intended to make the city more globally accessible from other metropolitan areas, and improve local artery or connector systems to avoid cut-through traffic and alleviate traffic jams. Simultaneously, GA 400's passing through the area cut off some local interconnections in the street system. During the process, streets were built up but they were poorly connected within the system. This resulted in a less integrated spatial system during the evolution. Furthermore, streets added during the process did not effectively increase the block numbers and shrink the size of block, which indicates cul-de-sacs were created to supply a path to the interior of the block and create more street frontage. Although only

public streets in the public domain are discussed here, an approach to developing large blocks, reconfiguring land subdivisions, and creating circulation access to buildings in the private domain is suggested.

The global-local duality. The global integration core came to be more distributed over time, especially along the newly constructed Buckhead Loop. The original core was located in the triangle district, and has spread to the Piedmont-Peachtree and Peachtree-Lenox corners. The core area is interconnected by the spine streets such as Peachtree, Piedmont and the Buckhead Loop. While the local integration cores remained comparatively stable during the process, even after introducing the Buckhead Loop and GA 400, they are locally disconnected from each other.

The dynamics of land use. From the land use perspective, the urban growth process is turning the original residential lands into commercial or mixed-use areas with high density while keeping a similar street framework. The consistent framework for different land uses indicates the dynamics of interior land subdivisions. Additionally, the distribution of the global integration core accompanied the encroachment of commercial area into the traditional neighborhoods during the evolutionary process.

The basic trends of increasing population and building density. Buckhead is one of the fastest growing areas in Metropolitan Atlanta. Its population increased more than 25 times over the past 80 years. Moreover, its building density has increased drastically by the significant increase in building volume under the existing street framework. The land was exploited by constructing more high-rise buildings. This, in turn, required that existing streets be adjusted, as we will see in more detail in the next chapter.

Private roads inside the large blocks follow land use patterns. Although there has not been any significant change in the block density per street in the public domain, block intensification often happens in the private domain. Within the super-block, secondary internal roads were created to the interior buildings from the street. In this way, road frontage inside the block was consequently created to maximize the economic value of the large land.

The major changes to the street network. GA 400 cut through the urban fabric and the Buckhead Loop was constructed connecting Peachtree, Piedmont, and Lenox to enclose and create a new block, the Tower Place block. It was located between two business concentrations and transformed one residential area to a commercial and mixed-use community. Under the context of the distribution of the global integration core, the block which used to be attached to the core now gradually became surrounded by it. The block's development process centralized the development process of Buckhead. This will be further discussed in the next chapter.

CHAPTER 4

TOWER PLACE DRIVE, A PRIVATE ROAD

One block, the Tower Place block, is selected as a case study of the urban development of Buckhead at the interior block scale. The Tower Place block is a typical edge city block showing how a previous suburban residential neighborhood changed into a high-density mixed use community. During the process, different layers of urban elements interact with each other and shape the urban fabric. In order to examine this interaction, the traditional historical-morphological studying method for urban form is applied and maps illustrating the changing conditions of different elements imposing on the urban fabric are constructed. The maps include surrounding streets, parcels and land subdivisions, building footprints, and the internal circulation system, at eight times between 1951 and 2008. These maps show how parcels were reconfigured under the regulatory framework, how buildings were situated to deal with both potentialities and constraints, and how a large block was fragmented into smaller sub-blocks through the circulation system. This evolutionary process occurred on private land, giving rise to conflicts between different interests and the ultimate reconciliation among different owners. A limited study of movement patterns is also presented, to provide measures of movement densities for the perimeter public streets and also for the private roads in the interior of the block. This serves to illustrate some of the tensions and potentials that arise as the network of private internal roads interacts with the network of public streets.

4.1 The Tower Place Block: From a Traditional Neighborhood to a New Dense Urbanism

The "Tower Place block" refers to the urban block in the heart of Buckhead, presently surrounded by Peachtree Road, Piedmont Road, the Buckhead Loop, and highway Georgia 400 (Figure 4.1(b)). The block is smaller than its historic antecedent, which was surrounded by Peachtree Road, Piedmont Road, Old Ivy Road, and Stratford Road (Figure 4.1(a)). Georgia 400 (GA 400, Turner MacDonald Parkway) cut through the block in 1993, and today's Tower Place block is on the west side of GA 400.

Peachtree and Piedmont Roads are among the best known spines of Atlanta. Their intersection in Buckhead occurs 0.76 miles to the northeast of the traditional heart of Buckhead (the intersection of Peachtree, Roswell, West Paces Ferry, and East Paces Ferry Roads, see Figure 4.1) and about the same distance to the southwest of two of the largest upscale shopping malls in the Southeast United States (Figure 4.1). In short, one of the street corners that define the Tower Place block is central to Buckhead and a key node for Atlanta as a whole.

The size of the Tower Place block is quite large, even in the context of Atlanta. As shown in Table 2.1, under the context of the nine square miles defined in Chapter 2, Atlanta Downtown has an average block size of 6.19 acres (2.50 hectares). Buckhead, Cumberland, and Perimeter, three of the edge cities in the Atlanta Region, have average block sizes of 29.84 acres (12.08 hectares), 55.38 acres (22.41 hectares), and 53.83 acres (21.78 hectares), respectively. The Tower Place block is almost ten times larger than Downtown's average block and two times as big as the average block in Buckhead. Compared with Cumberland and Perimeter, or even in the context of North Buckhead,

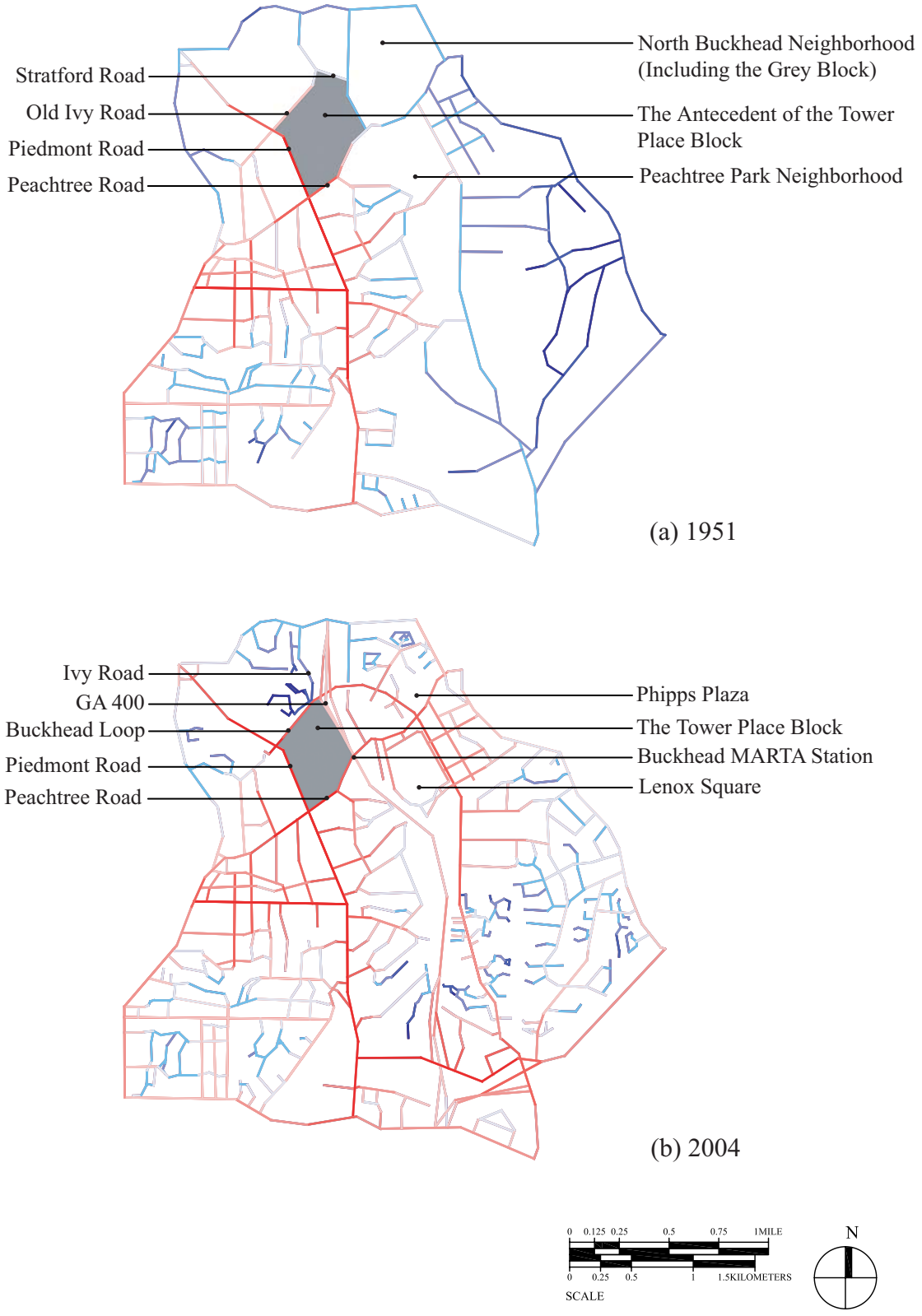

Figure 4.1 Global Integration Maps of the Study Area at Buckhead and the Locations of the Tower Place Block's Antecedent in 1951 and the Block in 2004 (Grey Area)

the block is by no means exceptional in size. But referring to Siksna's theory, the block can be classified as a super-block, far beyond the suitable size for movement, which suggests the internal intensification (Siksna 1997; 1998).

The block is, however, well connected. GA 400 links the affluent areas in North Atlanta to Downtown. It branches off interstate 85. At the Buckhead exit, the Buckhead Loop distributes traffic to the local arteries—Piedmont, Peachtree, and Lenox Roads. The Tower Place block has a direct connection to the Buckhead Loop. Thus, it benefits from global as well as local connectivity. From a syntactic point of view, the most integrated street segments at the perimeter of the block, within a two mile radius, remain Peachtree and Piedmont Roads (Figure 4.1). As the street system of Buckhead has evolved, the integration core of the area has become better distributed. From the point of view of the Tower Place block, the implication is that there are fairly direct and intelligible connections spreading out into surrounding areas, especially to the south, southwest, and southeast, where two business districts are concentrated. On a global scale, GA 400 provides a rapid link to Atlanta Downtown, less than eight miles to the south, as well as to Dunwoody and Perimeter Center, about seven miles to the north. In addition to these vehicular connections, the Tower Place block benefits from the Buckhead transit station of the Metropolitan Atlanta Rapid Transit Authority (MARTA) as well. The station is situated at the intersection of Peachtree Road and GA 400, and immediately accessible from the block. The northwestern branch of MARTA runs along the median of GA 400 (Figure 4.1). This creates a potential for enhanced pedestrian traffic, a quite distinctive condition by Atlanta standards.

The Tower Place block has experienced significant and, more recently, very accelerated growth. Using the best available maps and data[1], the general site maps were constructed along with a series of maps representing the entire block growth process. As seen in those maps, until 1950 the block was a typical suburban area representing a part of the North Buckhead neighborhood. It consisted of mostly residences with one school and one church (Figure 4.2). After the 1950s, the area had some businesses. The 1972 general site plan (Figure 4.3) shows that businesses were mostly located along Peachtree Road, especially in the Peachtree-Piedmont corner. Some of them were related to automobile sales and services, and others were offices and banks. The later site maps (Figure 4.4 to Figure 4.9) reveal that all pre-1974 buildings have been demolished to give way to subsequent development.

The first large development complex, which still exists today, comprises three main buildings—Tower Place Shopping Mall (currently called "Tower Walk Shopping Center"), Tower Place 100, and Tower Place Hotel (currently called "Doubletree Hotel"). The construction was completed in 1975, and the complex totals 1.3 million square feet. The greatest volume of buildings was built inside the block instead of along the street boundary. To enable this, the private road of "Tower Place Drive" was created to

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[1] The maps and data source includes:

1. General Site Maps, Fulton County, GIS website http://wms.co.fulton.ga.us/;
2. Atlanta, GA in Sanborn Map, 1951 and 1979 versions microfilm at Georgia Institute of Technology Main Library;
3. Realty Atlas, Fulton County, Georgia, by First American Real Estate Solutions located at Georgia Institute of Technology Main library;
4. Atlanta Region Aerial Photography, by Georgia Aerial Surveys, Inc. at Georgia Institute of Technology Main Library;
5. Google earth map, http://earth.google.com.

Figure 4.2 General Site Map of the Tower Place Block and the Adjoining Block, 1951

Figure 4.3 General Site Map of the Tower Place Block and the Adjoining Block, 1972

Figure 4.4 General Site Map of the Tower Place Block and the Adjoining Block, 1979

Figure 4.5 General Site Map of the Tower Place Block and the Adjoining Block, 1988

Figure 4.6 General Site Map of the Tower Place Block and the Adjoining Block, 1993

Figure 4.7 General Site Map of the Tower Place Block and the Adjoining Block, 2000

Figure 4.8 General Site Map of the Tower Place Block and the Adjoining Block, 2005

Figure 4.9 General Site Map of the Tower Place Block and the Adjoining Block, 2008

provide the requisite access (Figure 4.4). The name "Tower Place" was used in the documents ever since.[2] The highlight of the complex was Tower Place 100, a 29-story glass-covered office tower with over 600,000 square feet of floor space. Since then, the Tower Place block launched the development boom of Buckhead.

After thirty years of development (see Figure 4.5 to Figure 4.8), the Tower Place block has become a mixed-use community with the highest density in Buckhead. It is filled with high-rise towers blending various uses such as offices, hotels, condominiums, retail, and restaurants (Figure 4.9). The block is only a couple of blocks away from two prestigious malls, and is surrounded by numerous amenities—most within walking distance.

Based on available data,[3] the current aggregate floor area of all the buildings within the block is estimated at 7,815,671 square feet (726,100 square meters), representing an aggregate floor area ratio (FAR) of 2.753. This compares to 191,480 square feet (17,789 square meters) in 1951, representing an aggregate floor area ratio of 0.047. Thus, the current development density is 57 times greater than that in 1951, when the block was still a residential neighborhood and not yet developed.

The spatial logic of this accelerated pattern of growth is the topic for the rest of this chapter. In this introduction, we outline some of the parameters that characterize the block from an urban point of view. In subsequent sections we will discuss the framework of the edge streets, the subdivision of land into parcels, the building footprints, and the system of internal circulation. In doing so, we primarily follow the conventions of

[2] The name of "Tower Place" can be seen in Atlanta, GA, Sanborn Map, 1979 version.
[3] The data is mainly form: Buckhead Guidebook, 1995-2008, and other map sources as listed in 1.

historical-morphological studies combined with the syntactic analysis pursuant to the *Space Syntax* method. A fifth section provides a limited study of movement patterns.

4.2 The Street Network as a Framework for Growth

The streets enclosing the block act as the main framework for the development inside the block. The edge streets of the block experienced the most critical changes in the Buckhead street network since the development began. As shown in the street and parcel maps (Figure 4.10 to Figure 4.17), the changes occurred during the period of 1988 to 1993 when GA 400 was introduced to the area, and permanently changed the form of the block. GA 400 cut through the original block and divided it into two pieces. The more substantial piece to the west became today's Tower Place block, and the other was left over as land dangling between the highway and Stratford Rd.

The physical properties of the Tower Place block were crucially impacted after the construction of GA 400. The highway section adjacent to the block has three lanes in each direction, plus exit lanes, the MARTA station building, and a concrete dividing barrier producing a total width of approximately 200 feet. Measured from the 1988 and 1993 street maps (Figure 4.13 and Figure 4.14), the block face on Peachtree Road was shortened from 2,420 feet (737.62 meters) to 1,800 feet (548.64 meters). More importantly, the block size shrank from 94.21 acres (38.13 hectares) in 1988 to 65.96 acres (26.69 hectares) in 1993, reducing the area by one third. Still, the Tower Place block remains exceptionally large given that, as we have seen previously, it is situated in the middle of an urban center.

The old street network associated with the block changed when the Buckhead Loop was created to provide the connection between Peachtree, Piedmont and the

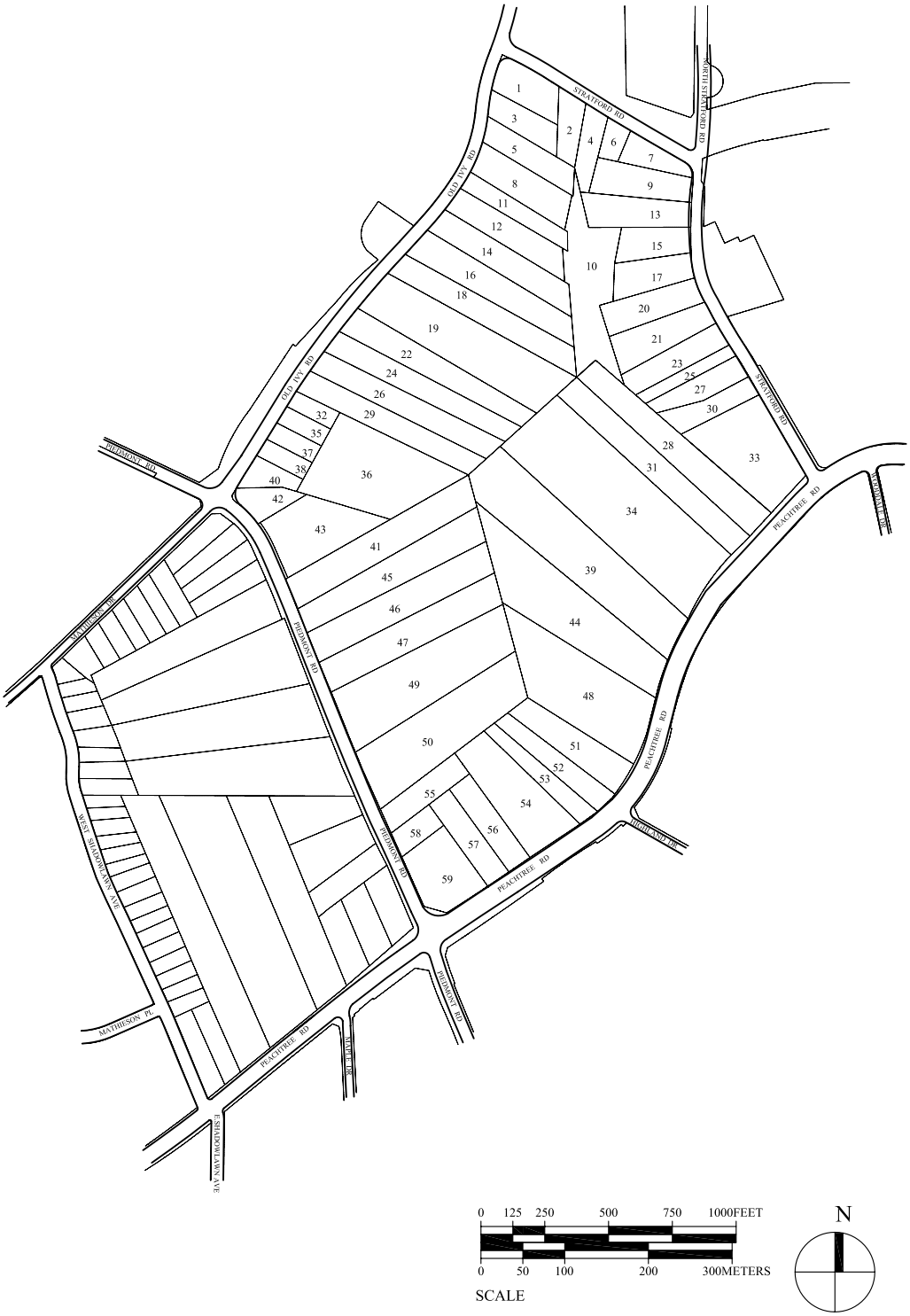

Figure 4.10 Street and Parcel Map of the Tower Place Block and the Adjoining Block, 1951

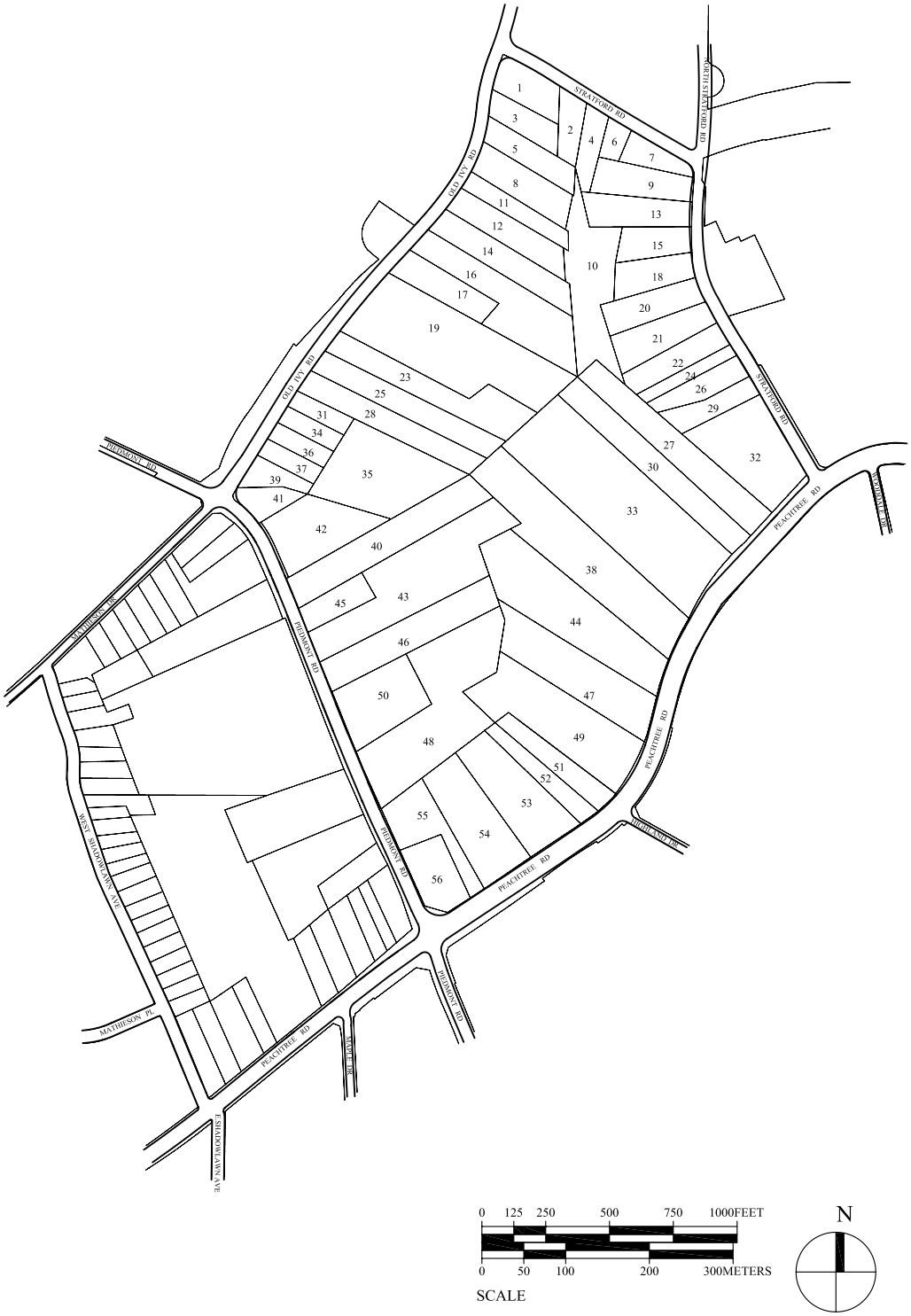

Figure 4.11 Street and Parcel Map of the Tower Place Block and the Adjoining Block, 1972

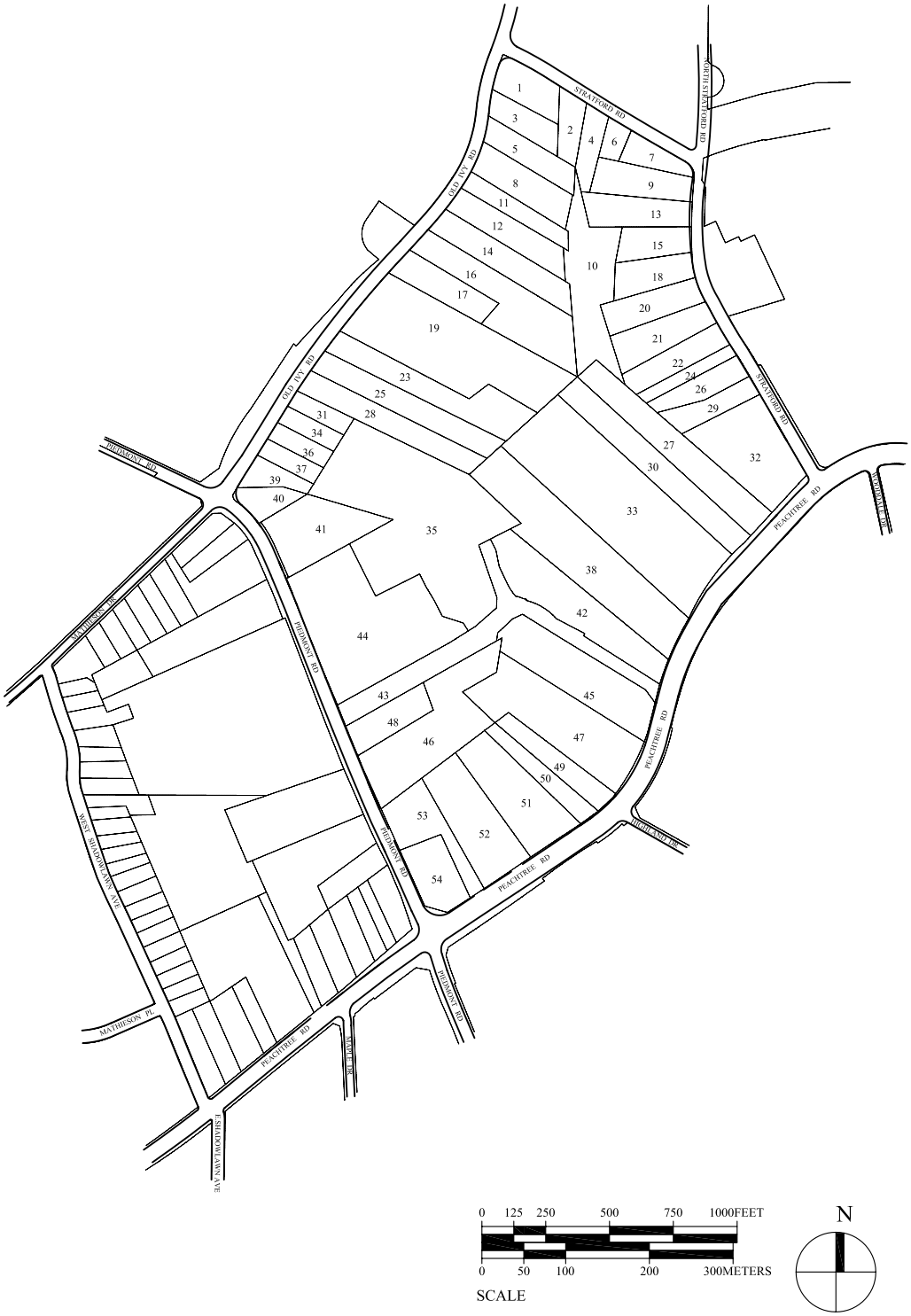

Figure 4.12 Street and Parcel Map of the Tower Place Block and the Adjoining Block, 1979

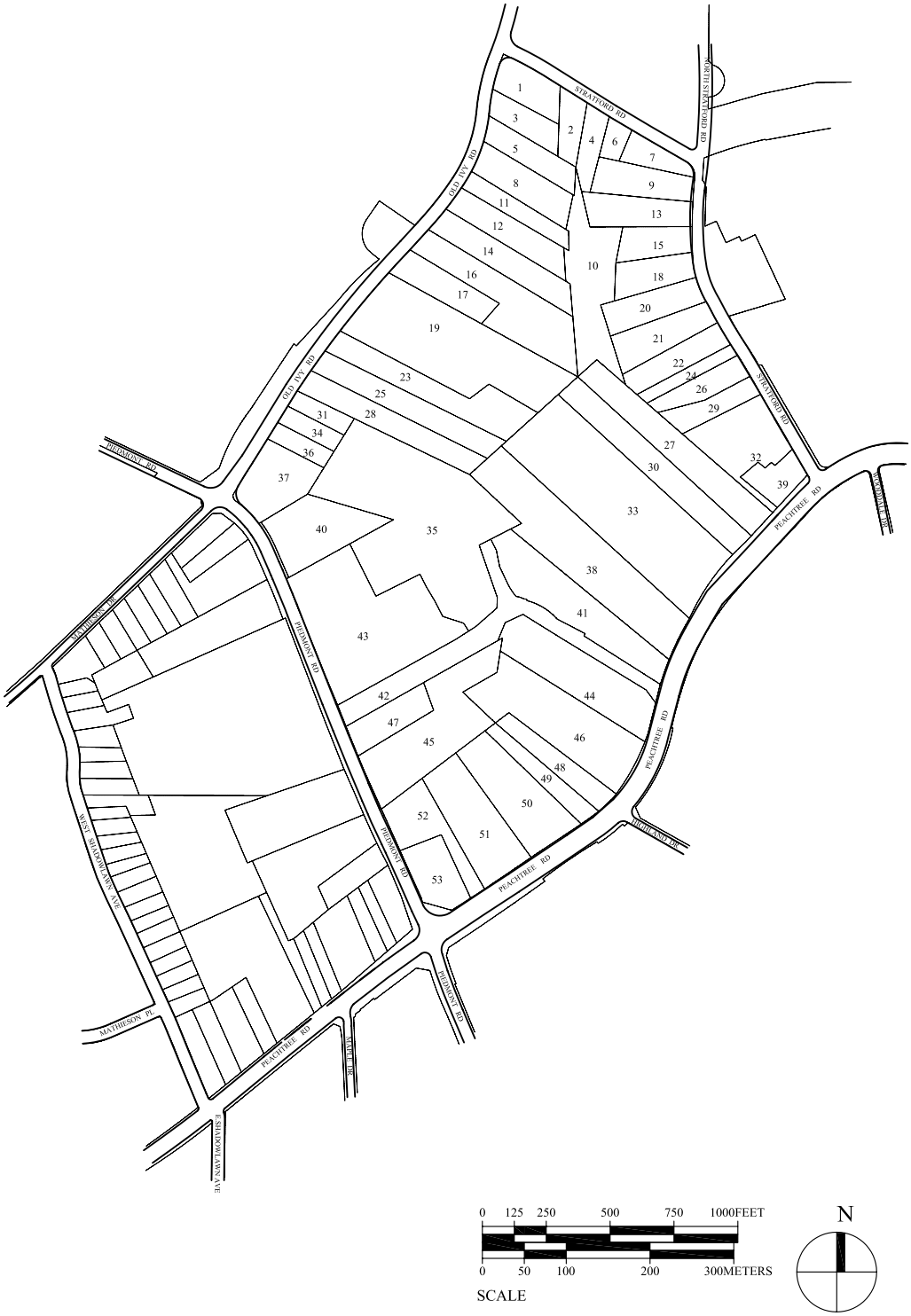

Figure 4.13 Street and Parcel Map of the Tower Place Block and the Adjoining Block, 1988

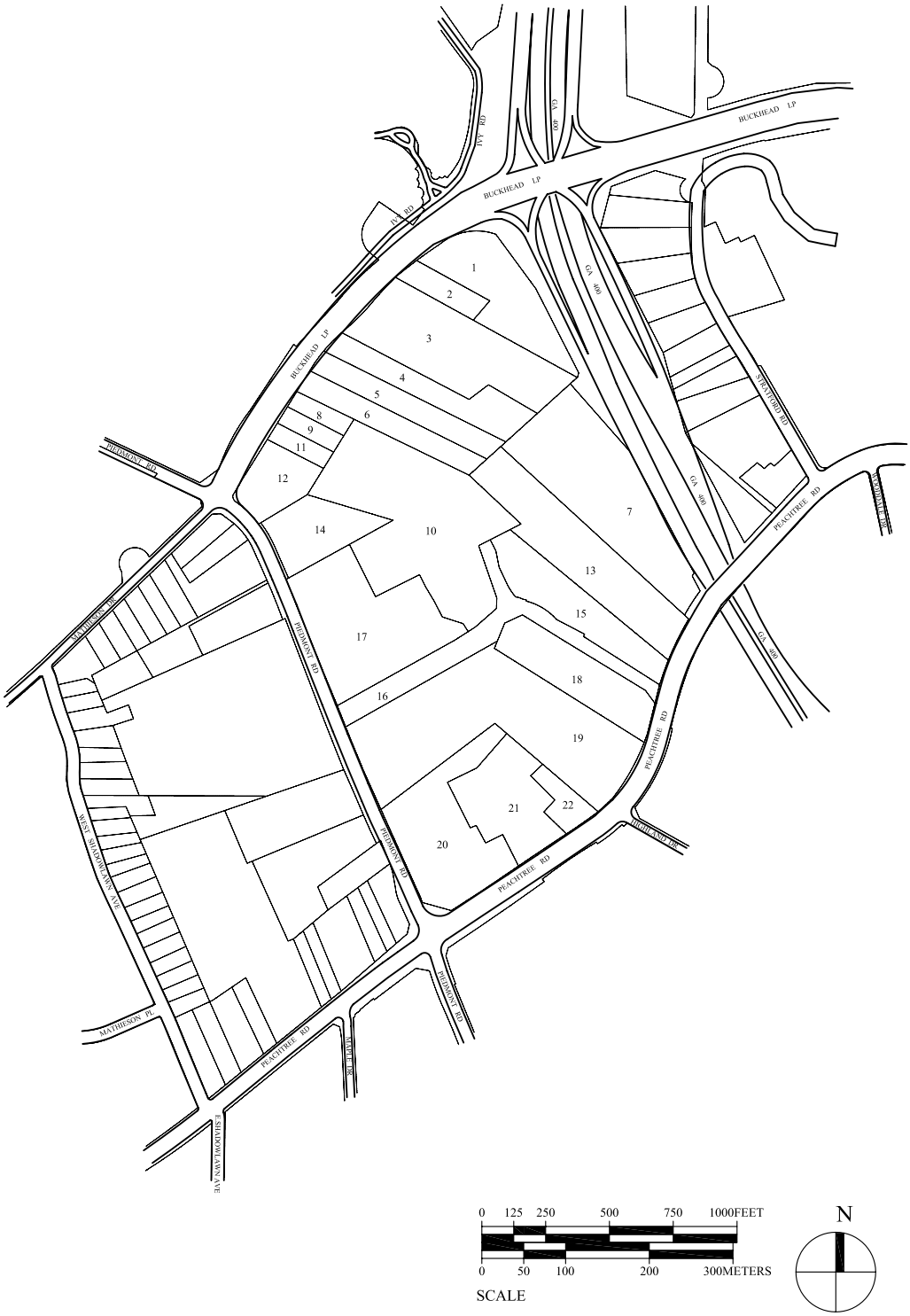

Figure 4.14 Street and Parcel Map of the Tower Place Block and the Adjoining Block, 1993

Figure 4.15 Street and Parcel Map of the Tower Place Block and the Adjoining Block, 2000

Figure 4.16 Street and Parcel Map of the Tower Place Block and the Adjoining Block, 2005

Figure 4.17 Street and Parcel Map of the Tower Place Block and the Adjoining Block, 2008

highway. Compared with the original proposal (Figure 3.25), the actual street system[4] connecting GA 400 to Buckhead was only partially accomplished in its north portion. The intent of the original plan was to avoid large-scale damage to the original Buckhead urban fabric while providing the necessary connections. However, the traffic from GA 400 still had to go through either Peachtree or Piedmont before getting distributed into the surrounding area. No alternative connections were added. Other changes associated with the advent of the Buckhead Loop include the disconnection of two edge streets—Old Ivy Road and Stratford Road—from the surrounding area.

The Buckhead street system was analyzed in the previous chapter. In the context of the larger urban area (2.5 x 2.5 miles), the syntactic properties of two intersections and three edge streets surrounding the block are analyzed. The two intersections include the junction of Peachtree Road and Piedmont Road (Int. 1), and the junction of Piedmont Road and the Buckhead Loop (Old Ivy Road before 1992) (Int. 2). The three edge streets are Peachtree Road, Piedmont Road, and the Buckhead Loop (Old Ivy Road before 1992). Taking the average Integration (Real_Int. R(n)) and Integration radius 3 (Real_Int. R(3)) values for the axial lines that represent the edge streets (Peachtree Road, Piedmont Road, and the Buckhead Loop), attention is focused on the differences the new connections made and which side of the block was more integrated into the surroundings. The result is shown in Table 4.1, 4.2 and Figure 4.18. The following conclusions were drawn from the tables and figures:

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[4] It was named as the "Boulevards" in proposed plan in 1960 (Atlanta Region Metropolitan Planning Commission 1960, 18).

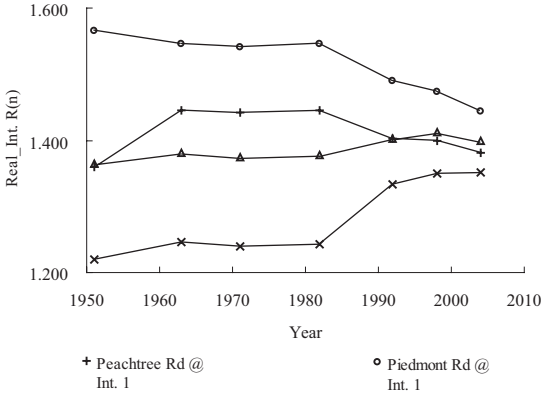
Table 4.1 Local Integration Values for Two Intersections and Three Edge Streets of the Tower Place Block at Buckhead from 1951 to 2004

	Intersection 1 (Int. 1)		Intersection 2 (Int. 2)		Edge Streets		
Year	Peachtree Rd	Piedmont Rd	Piedmont Rd	Buckhead Loop / Old Ivy Rd	Peachtree Rd	Piedmont Rd	Buckhead Loop / Old Ivy Rd
1951	1.843	2.209	1.393	1.607	1.213	1.801	1.264
1963	1.887	2.277	1.416	1.634	1.241	1.847	0.974
1971	1.875	2.264	1.408	1.624	1.234	1.836	0.968
1982	1.870	2.247	1.404	1.619	1.238	1.825	0.966
1992	1.921	2.319	1.616	1.433	1.272	1.968	0.990
1998	1.942	2.333	1.385	1.099	1.286	1.859	1.141
2004	1.990	2.380	1.420	1.126	1.318	1.900	1.170

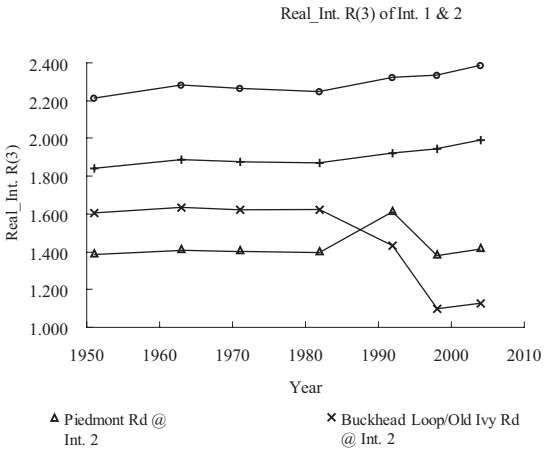
Table 4.2 Global Integration Values for Two Intersections and Three Edge Streets of the Tower Place Block at Buckhead from 1951 to 2004

	Intersection 1 (Int. 1)		Intersection 2 (Int 2)		Edge Streets		
Year	Peachtree Rd	Piedmont Rd	Piedmont Rd	Buckhead Loop / Old Ivy Rd	Peachtree Rd	Piedmont Rd	Buckhead Loop / Old Ivy Rd
1951	1.359	1.566	1.365	1.221	1.216	1.465	1.116
1963	1.446	1.545	1.381	1.247	1.335	1.463	1.114
1971	1.442	1.542	1.375	1.240	1.329	1.458	1.107
1982	1.445	1.546	1.377	1.243	1.337	1.462	1.109
1992	1.403	1.490	1.403	1.333	1.302	1.447	1.247
1998	1.399	1.474	1.413	1.350	1.319	1.443	1.311
2004	1.382	1.444	1.399	1.351	1.321	1.422	1.325

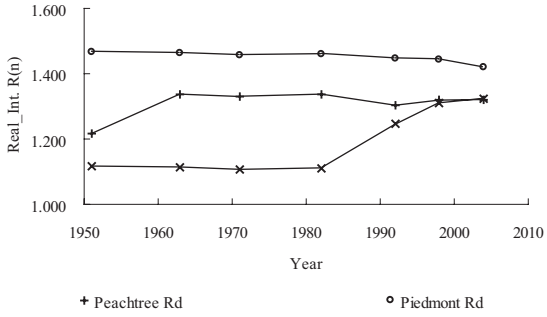
1. There are some inconsistencies in the two intersections. Int. 1 became less globally integrated but more locally integrated while Int. 2 became more globally integrated



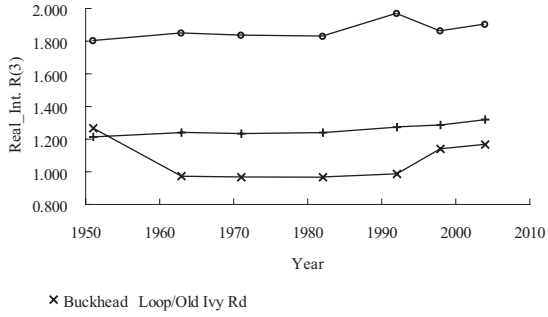
(a) Global Integration Value (Real_Int. R(n) Changes for Two Intersections



(b) Local Integration Value (Real_Int. R(3) Changes for Two Intersections



(a) Global Integration Value (Real_Int. R(n) Changes for Three Edge Streets



(b) Local Integration Value (Real_Int. R(3) Changes for Three Edge Streets

Figure 4.18 Integration Value Changes for Two Intersections and Three Edge Streets of the Tower Place Block

but less locally integrated. The changes accelerated between 1982 and 1993 when the Buckhead Loop was constructed. Despite the trend, a comparison of the two intersections shows Int. 1 to be more integrated both globally and locally throughout the entire period. In another word, the "syntactic focus" of the block remains at the Peachtree Road-Piedmont Road corner.

2. The values of the edge streets naturally changed as well. Generally, both Piedmont and Peachtree roads became less globally integrated but more locally integrated, a natural consequence of the new connections helping to better distribute the integration core as seen in the previous chapter. As for the Buckhead Loop (Old Ivy Road before 1982), the local integration decreased before it increased (the turning point is between 1972 and 1982). However, its global integration increased constantly. When we consider the edge street integration values comparatively, the relationship between Piedmont Road, Peachtree Street, and the Buckhead Loop remains constant with Peachtree Road and the Buckhead Loop converging over time.

These results are consistent with the original goals for constructing GA 400 and the Buckhead Loop. If indeed integration is associated with higher traffic volumes as reported in the syntactic studies reviewed earlier, the decrease of the global integration in Peachtree Road and Piedmont Road is consistent with the intention to relieve north-south through traffic; the parallel increase of the global integration of the Buckhead Loop is consistent with the intention of providing a better connection to other areas in Atlanta.

But some conflicts exist between the syntactic analysis and real situations as well. During the period of urban evolution, the width of the streets also changed. One thing needs to be clarified related to the topic—the width of right-of-way or the width of

roadway. Usually the former includes not only the latter but the sidewalks as well. Here, we are discussing the width of roadways. Based on the Sanborn maps and aerial photos, Table 4.3 shows the roadway width changes of three edge streets of the block. The biggest increase happened in the Buckhead Loop, from 30 feet (9.14 meters), when it was known as Old Ivy Road prior to 1982, to 120 feet (36.58 meters) today. The width of the Buckhead Loop allows it to receive traffic volumes that will be distributed to the main streets, and prevents traffic from accumulating and piling up on GA 400, although some piling up occurs at rush hours near the exit ramps. Peachtree Road increased from 60 feet (18.29 meters) to 100 feet (30.48 meters) and Piedmont Road increased from 36 feet (10.97 meters) to 60 feet (18.29 meters). The numbers suggest a conflict between the integration value and the street width. Although Piedmont Road is the most integrated street of the three, it has the narrowest width. At the same time, and perhaps in parts because of that, Piedmont Road shows significant congestion during rush hours, when policemen are routinely needed on weekdays, to regulate traffic at the junction of Piedmont Road and the Buckhead Loop.

Table 4.3 Roadway Width Changes for Three Edge Streets of the Tower Place Block at Buckhead from 1951 to 2004

Year	Peachtree Rd (Ft.)	Piedmont Rd (Ft.)	Ivy Rd / Buckhead Loop (Ft.)
1951	60	36	30
1972	60	36	30
1979	60	36	30
1988	60	36	30
1993	80	60	60
2000	80	60	115
2005	80	60	115
2008	100	60	120

4.3 Parcel as the Intermediate Constraint

Given its huge size, the block had to be subdivided such that all parcels in the block were of suitable size to accommodate the buildings and supply means of access from the buildings to the public framework of streets. The evolution of land subdivision is shown on Figures 4.10 to 4.17. In 1951, almost every lot was rectangular-shaped with narrower street frontage and deeper length toward the interior of the block. Almost all lots had direct access to the public streets. But this feature changed with the new urban development. The lots became larger and more irregular in later years. More emerged inside the block without street frontage, requiring internal roads to become connected to the street network.

Further analysis reveals several trends in parcel size, shape, access, and street frontage. Table 4.4 shows that the number of parcels dropped over the period under investigation. The original block had 59 parcels in 1951 and fell to 26 in 2008. From 1988 to 1993, the parcel number plummeted from 53 to 22. Even after we take into

Table 4.4 Metric Properties of the Tower Place Block from 1951 to 2008

Year	Block Area (Sq. Ft.)	Block Area (Acres)	Number of Sub-blocks	Parcel Numbers	Average Parcel Area (Sq. Ft.)	Average Parcel Area (Acre)
	S(b1)	S(b2)	N(b)	N(p)	S(p1)	S(p2)
1951	4,103,931	94.21	1	59	69,558.15	1.60
1972	4,103,931	94.21	1	56	73,284.48	1.68
1979	4,103,931	94.21	2	54	75,998.72	1.74
1988	4,103,931	94.21	2	53	77,432.66	1.78
1993	2,873,100	65.96	3	22	130,595.46	3.00
2000	2,839,431	65.18	4	22	129,065.03	2.96
2005	2,839,431	65.18	4	25	113,577.23	2.61
2008	2,839,431	65.18	6	26	109,208.87	2.51

account the decrease in the overall block size due to GA 400, the average parcel area increased from 1.60 acres in 1951 to 2.51 acres in 2008. The numbers suggested that land reconfiguration, especially merging and consolidation, inside the block most likely occurred during the evolutionary process.

Parcel shape also changed, especially regarding compactness. This matters because parcel shape can influence the design options for positioning a building on site. The creation of larger and more compact parcels gives more flexibility for disposing buildings. Mathematically, for parcels of different shapes with the same area, the most compact one is the circle with the smallest perimeter. To measure compactness, we compare the perimeter of a parcel (P(p)) and the perimeter of a circle (P(m)) with the same area. The higher the ratio (P(p)/P(m)), the less compact the parcel. Table 4.5 illustrates an increase in parcel shape compactness between 1951 and 2008 from a 1.468 ratio to a 1.348 ratio. Considering the increased lot size, there would be greater flexibility for placing buildings on the lot in 2008.

Table 4.5 Metric Properties of Parcels at the Tower Place Block from 1951 to 2008

Year	Average Parcel Perimeter (Ft.)	Perimeter of Circle w/ the Same Area S(p1)	Compact-ness	Average Shortest Side of Parcel (Ft.)	Average Longest Side of Parcel (Ft.)	Ratio of Shortest Side/Longest Side
	P(p)	P(m)	P(p)/P(m)	L(s)	L(l)	L(s)/L(l)
1951	1,299.94	875.42	1.468	114.20	522.77	0.252
1972	1,319.58	897.09	1.457	105.34	498.02	0.246
1979	1,360.92	903.89	1.485	90.29	489.37	0.219
1988	1,383.95	916.86	1.489	86.51	495.54	0.206
1993	1,810.73	1,188.62	1.516	79.93	563.97	0.165
2000	1,669.99	1,158.74	1.401	66.44	436.73	0.173
2005	1,533.05	1,101.24	1.348	44.22	393.52	0.138
2008	1,507.92	1,081.84	1.348	42.21	387.48	0.133

Simultaneously, the compactness generates access problems from the perimeter to the center of the overall block. As parcels become more compact, the ability to maintain frontage on any of the surrounding streets in the context of a deep block is proportionally decreased. As will be shown later, some parcels have come to rely exclusively on internal roads for access. Indeed, while almost all parcels had perimeter frontage in 1951, only 53.85% had such frontage in 2008 and the ratio dropped consistently. Table 4.6 presents information on the street frontage for each parcel. In order to measure the direct access to public streets for each parcel the "street frontage to parcel perimeter" ratio, (L(f)/P(p)), is calculated where L(f) is the length of the street frontage and L(p) is the length of the perimeter. The table shows how the average street frontage ratio changed. The ratio slightly increased from 0.126 in 1951 to 0.135 in 1988, and then decreased to 0.110 in 2008. Thus, for a given perimeter, a parcel had more frontage in 1988 than in 1951, but less frontage in 2008. Again, this confirms that access to the parcels was becoming increasingly dependent on the creation of an internal circulation system. These changes in parcels create the necessity of internal function roads inside the private lands.

The most important characteristic of the parcel is that it is a unit of private land owned by one or more owners. In order to truly understand the mechanism of urban growth and the underlying factors shaping the urban form, it is important to understand how land owners deal with their conflicts of interest and how they negotiate, especially when more than one land owners are involved, such as creating internal access to several lots inside the block. But, tracking the negotiation of rights of way and the agreements between land owners to allow access to parcels is not easy. On occasion, we found

Table 4.6 Comparison of Street Frontage and Internal Road Frontage for the Parcels Inside the Tower Place Block from 1951 to 2008

Year	Number of Parcels w/ Street Frontage	Parcel w/ Street Frontage Ratio	Average Street Frontage of Parcel (Ft.)	Number of Parcels w/ Internal Rd Frontage	Parcel w/ Internal Rd Frontage Ratio	Average Internal Road Frontage of Parcel (Ft.)
	N(f)	N(f)/N(p)	L(f)	N(i)	N(i)/N(p)	L(i)
1951	58	98.31%	142.53	0	0.00%	0.00
1972	55	98.21%	150.21	0	0.00%	0.00
1979	52	96.30%	155.76	6	11.11%	64.23
1988	51	96.23%	159.13	6	11.32%	65.44
1993	21	95.45%	226.40	5	22.73%	157.84
2000	14	63.64%	219.05	14	63.64%	308.72
2005	14	56.00%	192.77	20	80.00%	321.90
2008	14	53.85%	185.36	21	80.77%	325.98

Year	Street Frontage Ratio	Internal Road Frontage Ratio	Total Internal Circulation (Sq. Ft.)	Internal Circulation Ratio
	L(f)/P(p)	L(i)/P(p)	S(i)	S(i)/S(b1)
1951	0.126	0.000	0	0.00%
1972	0.130	0.000	82,278	2.00%
1979	0.133	0.036	159,189	3.88%
1988	0.135	0.036	124,082	3.02%
1993	0.135	0.074	171,558	5.97%
2000	0.119	0.192	368,759	12.99%
2005	0.114	0.245	405,277	14.27%
2008	0.110	0.251	465,859	16.41%

discrepancies between the records of parcel boundaries kept at Fulton County[5] and the records submitted to the City of Atlanta's Building Office as part of the Building Permit application process.[6] Referring to all available resources, a land ownership map was constructed (Figure 4.19). Several important characteristics are revealed in the map:

1. The internal road of Tower Place Drive was built on private land as were the other internal roads constructed later.
2. There were some deeds and agreements between different land owners to provide access and utilities. This allowed areas without street frontage to have access to public rights-of-way.
3. In the Tower Walk and Tower Place 100 complex, the land ownership map (Figure 4.19) shows one large piece of land, while the parcel map series (Figure 4.15 to Figure 4.17) shows four parcels, with one separate parcel for the internal road, Tower Place Drive. Based on a conversation with Kemp Mooney (Mooney 2009), we confirmed that all pieces did belong to one owner, Charles Ackerman. The thought is, in order to process the later deeds and agreements for access and easement, the land was specified separately in legal documents. Therefore, the official parcel maps defined them as different parcels although owned by the same owner.

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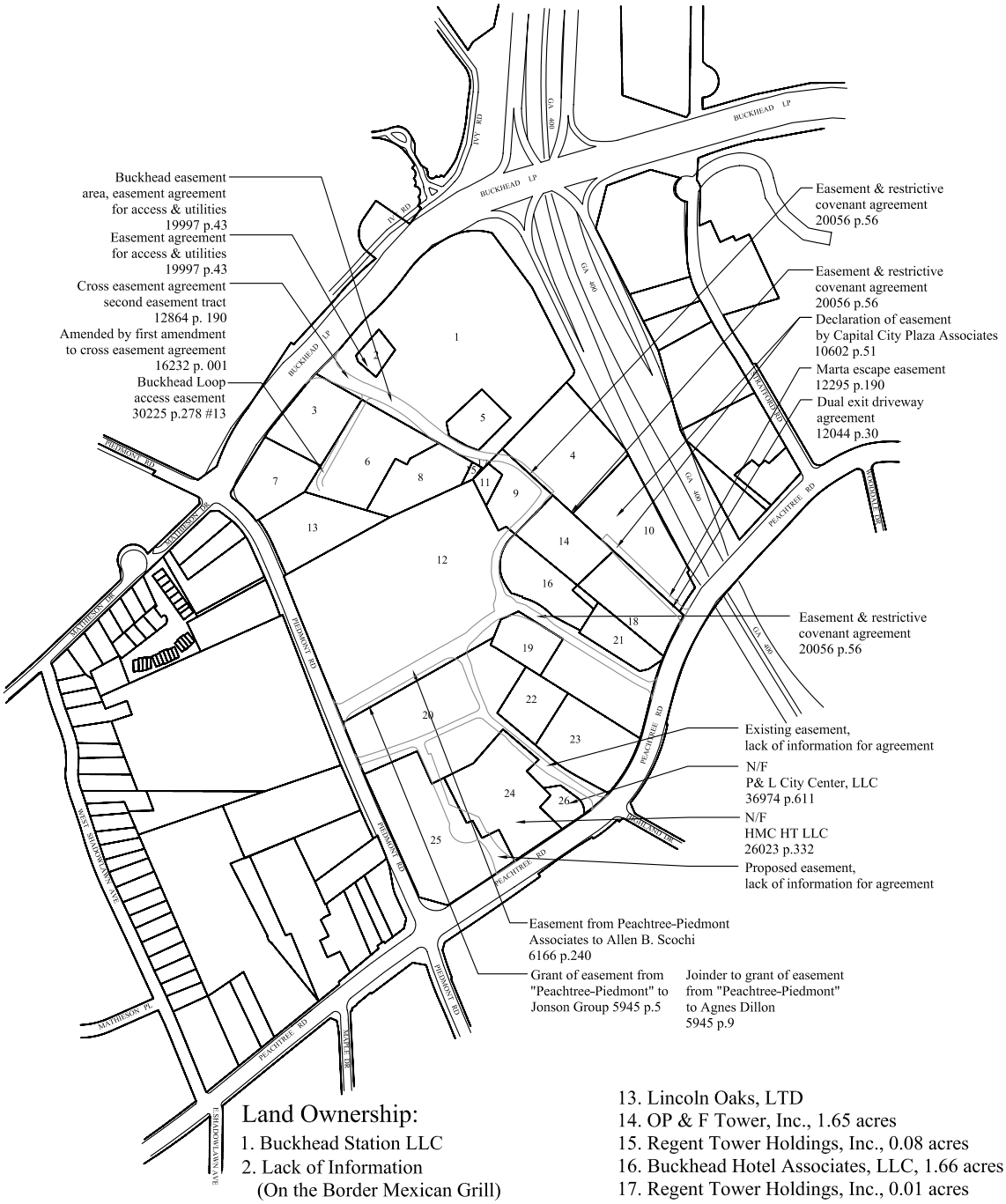
[5] Refer to: Realty Atlas, Fulton County, Georgia, 1973-2000, by First American Real Estate Solutions located at Georgia Institute of Technology Main library;

[6] Two historic surveys are included here. They addressed most parcels' information and ownership within the Tower Place block, plus some agreements between land ownerships related to parcels and accesses. One was done by Mayes, Sudderth & Etheredge, Inc. in September 2001. The other was done by HKS in October 2005. Both were obtained by the City of Atlanta in November 2008.



Land Ownership:

1. Buckhead Station LLC
2. Lack of Information (On the Border Mexican Grill)
3. Charles S. Ackerman, 1.69 acres
4. Lack of Information (Parking Lot)
5. Lack of Information (One Buckhead Loop)
6. Regent Tower Holdings, Inc., 2.43 acres
7. Lack of Information (Ivy Place)
8. Regent Tower Holdings, Inc., 1.67 acres
9. Regent Tower Holdings, Inc., 1.22 acres
10. Capital City Plaza Associates
11. Regent Tower Holdings, Inc., 0.26
12. Tower Place, L. P., 13.53 acres
13. Lincoln Oaks, LTD
14. OP & F Tower, Inc., 1.65 acres
15. Regent Tower Holdings, Inc., 0.08 acres
16. Buckhead Hotel Associates, LLC, 1.66 acres
17. Regent Tower Holdings, Inc., 0.01 acres
18. Regent Tower Holdings, Inc., 1.87 acres
19. Lack of Information (Courtyard Buckhead Hotel)
20. Cousins Properties, Inc.
21. Regent Tower Holdings, Inc., 1.15 acres
22. Lack of Information (Parking Deck)
23. Realm
24. HMC HT LLC
25. Cousins Properties, Inc.
26. P & L City Center, LLC

Figure 4.19 Parcel Land Ownerships and Agreements Among Owners Within the Tower Place Block, 2005

4. In the central sites of the block, five pieces of land are claimed in this map although they are all owned by Regent Tower Holdings, LLC. In the 2000 parcel map series, they were shown as one parcel (Figure 4.15). The discrepancy might indicate a phased land purchasing process by the owner with later land consolidation.

Despite the discrepancies identified above, the maps clarify the land ownership within the block and the transformation of property lines associated with the negotiation of rights of way and access. This process is an aspect of the peculiar form of negotiated organic growth that has occurred, and generated the shape of the internal private road, today's Tower Place Drive.

4.4 Buildings as the Drivers of Urban Form

This section tracks the size of buildings, their floor area ratio (FAR), and their main program. It also records the way in which buildings interface with streets, the way in which they orient themselves within the parcels.

The building footprint maps (Figure 4.20 to Figure 4.27) are constructed based on the sources listed above. The maps show the significant increase in building volumes during the urban development. After collecting the available information about the buildings inside the block at different times, the building floor area changes can be tracked (Table 4.7). The total floor area in 1951 was 191,480 square feet (17,789 square meters) representing 0.047 FAR. By 1972, commercial premises had developed along Peachtree Road and the total floor area became 529,980 square feet (49,237 square meters) representing 0.129 FAR. However, the critical step in the block's development is shown in the 1979 map. In 1975, after the first three large buildings were constructed, the total floor area skyrocketed to 1,957,032 square feet (181,814 square meters) with

Figure 4.20 Building Footprint Map of the Tower Place Block and the Adjoining Block, 1951

Figure 4.21 Building Footprint Map of the Tower Place Block and the Adjoining Block, 1972

Figure 4.22 Building Footprint Map of the Tower Place Block and the Adjoining Block, 1979

Figure 4.23 Building Footprint Map of the Tower Place Block and the Adjoining Block, 1988

Figure 4.24 Building Footprint Map of the Tower Place Block and the Adjoining Block, 1993

Figure 4.25 Building Footprint Map of the Tower Place Block and the Adjoining Block, 2000

Figure 4.26 Building Footprint Map of the Tower Place Block and the Adjoining Block, 2005

Figure 4.27 Building Footprint Map of the Tower Place Block and the Adjoining Block, 2008

0.477 FAR. Among the buildings, the 29-story Tower Place 100 building had about 610,000 square feet (parking deck not included) and occupied more than 30% of the block's total square footage. Then, during the process of urban development, the aggregate building square footage accelerated, especially from 2005 to 2008, when it changed from 4,345,310 square feet (403,693 square meters) with 1.530 FAR to 7,815,671 square feet (726,100 square meters) with 2.753 FAR, an increase of more than two million square feet in less than four years. The numbers show the current density of buildings to be 58.57 times higher than 1951.

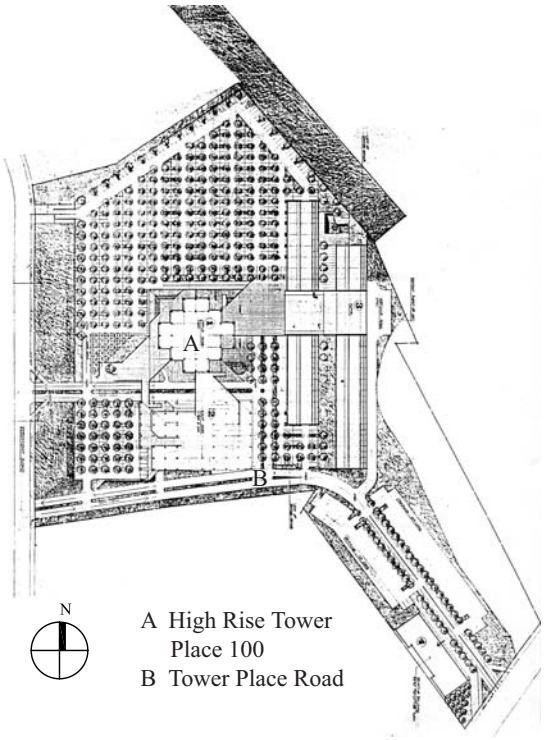
Table 4.7 Building Data for the Tower Place Block from 1951 to 2008

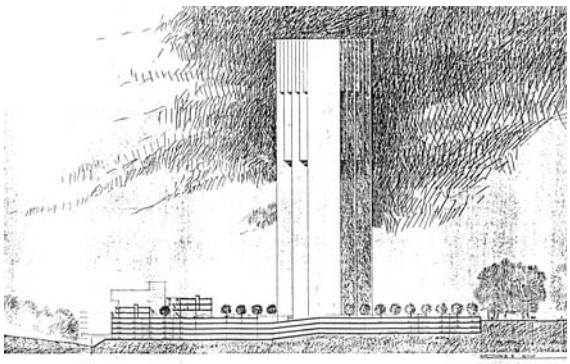
Year	Total Footprint Area (Sq. Ft.)	Total Floor Area (Sq. Ft.)	Average Number of Floors	Ground Floor Area Ratio	Floor Area Ratio (FAR)
	S(f)	S(t)	S(t)/S(f)	S(f)/S(b1)	S(t)/S(b2)
1951	146,230	191,480	1.31	0.036	0.047
1972	322,230	529,980	1.64	0.079	0.129
1979	675,380	1,957,032	2.90	0.165	0.477
1988	635,720	2,433,340	3.83	0.155	0.593
1993	619,040	2,762,810	4.46	0.215	0.962
2000	816,144	3,778,810	4.63	0.287	1.331
2005	881,144	4,345,310	4.93	0.310	1.530
2008	1,154,644	7,815,671	6.77	0.407	2.753

Combined with the land use maps of 1960 and 2001 (Figure 3.27 and Figure 3.29), the building footprint map series illustrates a comprehensive evolution of how a residential block transformed into a mixed use community with high density. The 1951 map shows a residential area with one school and one church. In the 1960s land use maps (Figure 3.27), the entire block consisted of single-family residences with some

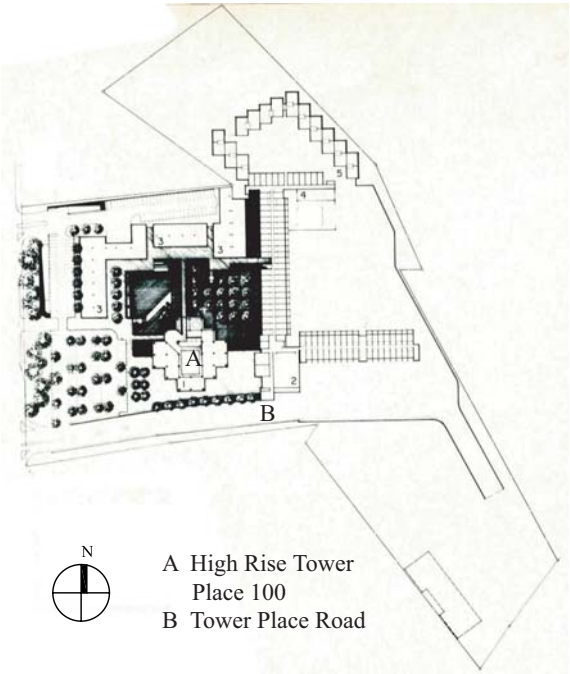
commercial retail and offices along Peachtree Road. This is confirmed by the 1972 map. The 1979 map shows the three commercial buildings still present today. They were located in the heart of the block instead of along the street. Their position established the path of the developments thereafter and critically influenced the urban form of the block.

The main question is why the first high rise was not placed closer to the edge of the block. At that time, the land owner and developer, Charles Ackerman, and project architect Kemp Mooney, both considered the options for the new high rise building. While Ackerman's property (Parcel 12 in Figure 4.19) had better frontage on Piedmont Road, the decision was taken to provide the development with a Peachtree Road address, 3340 Peachtree Road. This necessitated the creation of an internal street, Tower Place Drive, linking Peachtree Road to Piedmont Road via the areas closer to the center of the block. Perusal of various plans revealed that the exact alignment of Tower Place Drive has shifted with changes in building and site design. These shifts confirm that the creation of a street was not an independent design goal but was really approached as a means to making the building program possible. Thanks to the creation of the internal road, the 29-story office building (originally designed for 50 floors) could be placed deep into the site, with low rise constructions (retail, leisure) creating commercial frontage on Piedmont Road and a medium rise hotel situated on the portion of Tower Place Drive leading to Peachtree Road (Mooney 1972; 2009; see Figure 4.28). Thus, the 1979 map tells the story of radical discontinuity. The block shifted from edge to internally oriented development. As a consequence, internal circulation roads started to effectively fragment its integrity. The process is associated with the emergence of high volume investments.





(a) Earlier Concept of the Project
Left: Plan
Above: Elevation (50 Stories)
(Source: Mooney 2009)



(b) Later Concept of the Project
Left: Plan
Above: Model (50 Stories)
(Source:
Plan: Mooney 1972, 131;
Model Picture: Mooney 2009)

Figure 4.28 Different Design Concepts for Tower Place 100
by Architect Kemp Mooney in 1971

According to some historic documents, Peachtree Road was considered a more economically profitable address than Piedmont Road at that moment. The primacy of Peachtree Road was proved in the development plan for Buckhead in 1960. It declared that two business cores in Buckhead, the mall area and the traditional triangle area, were connected by Peachtree Road (Atlanta Region Metropolitan Planning Commission 1960). Therefore, it was good commercial practice to construct the high-rise building as close as possible to Peachtree Road to draw people in and attract patrons and businesses to maximize the land value. However, the parcel near Peachtree Road was not wide enough to accommodate the building. Thus, creating the internal road was the best option to reconcile economic priorities and the geometrical constraints associated with the program. All the reasons supported the initial design decision by Ackerman and Mooney, and resulted in a latent pattern of design that set the stage for subsequent urban development.

From the later maps (Figure 4.23 to Figure 4.27), it can be seen that the Tower Place block was consistently growing. The new developments blended offices, condominiums and retail spaces, all constructed around the first three buildings and spreading over the entire block. The controlling force of the previous business concentration, the corner of Peachtree and Piedmont roads, was, at least for a period of time, fading away. This became even more obvious after introducing the highway and opening the Buckhead Loop. When new developments were constructed near the Buckhead Loop, such as the One Buckhead Loop high-rise condominiums (A in Figure 4.25) and the Buckhead Station shopping center (B in Figure 4.25), they were far from the classical business concentration. But this trend reversed around 2005 when several

large developments were initiated at the traditional business corner and along Peachtree Road.

While the 1988 and 1993 maps (Figure 4.23 and Figure 4.24) show the addition or replacement of buildings on the perimeter of the site, both on Peachtree and Piedmont roads, the 2000 and 2005 maps (Figure 4.25 and Figure 4.26) show significant development in the interior of the block, following the precedent set by the original Tower Place development. One Buckhead Loop (A in Figure 4.26) and Grandview Tower (B in Figure 4.26), for example, are major buildings only accessible from internal circulation roads. Such internal development was motivated partially by the advent of the Buckhead Loop in 1993 which provided additional access paths from what used to be the back of the block. But, this process of internal development, enabled by the creation of additional internal circulation routes, is associated by a deeper change in the spatial logic.

In a familiar process represented by the maps from 1951 and 1972, buildings are built on parcels which front public streets. The network of public streets functions as the constitutional framework for private investment. They are the stable, long-term order within which the city evolves. They provide a sense of shared orientation, an address. The break with this tradition, documented in the 1979 map, initiates a different logic. Roads are now constructed as a consequence of the design of particular buildings, or rather as a consequence of particular investment decisions. The question of whether or not these roads can function as a framework for future change is not asked, at least not overtly. On the ground, circulation emerges as a byproduct of the presence of buildings rather than buildings getting built along pre-existing streets. Fundamentally, urban circulation and movement become dissociated from the public realm. The confusion of

addresses provides one tell-tale sign of these deeper changes in spatial logic. The original 29-story building of Tower Place is referenced both as Tower Place 100 and as 3340 Peachtree Road. The "internal private address" is more precise, but the "public address" survives even as it can no longer help to discriminate between specific destinations within the corporate realm.

Internal development, however, does not detract from the continuing importance of the Peachtree – Piedmont Road intersection, which remains an important urban node. In 1972, 68% of the total floor area was concentrated along Peachtree Road near this intersection. The percentage dropped to 23% with the addition of large built volumes while 70% of the total floor area (including parking deck) moved to the interior of the block. The numbers indicated that in the first spatial oscillation of urban development the focus was diverted from the corner to the internal heart of the block. From 1979 to 2000, new developments continued and seemed to emphasize the trend by growing around the heart of the block as well as along the perimeter. For instance, the 25-story Hotel Nikko, later becoming the Grand Hyatt Hotel (A in Figure 4.24), was built along Peachtree Road in 1990. The evolution proves the building developments spread out within the block, especially after the construction of GA 400 and the Buckhead Loop. New buildings were sited on the original undeveloped lands along these two streets. For example, the 2-story Buckhead Station retail complex and the 18-story One Buckhead Loop condominium were built in 1996. One possible theory is the land was more economic compared with the land along Peachtree Road and still had easy access to the outside street and highway. At this moment, the urban development lost its focus and in 2008 the percentage of total floor area along Peachtree Road changed. After the addition

of Terminus 100 (10 Terminus Place), Tower Place 300 (Sovereign), and Realm, the volume of very recent development at this intersection raised the percentage to 54%. Thus, in the period under consideration, the Tower Place block has oscillated between two poles of development, internal and peripheral. By implication, it has exemplified both ends of the spectrum regarding the deeper spatial logic of development discussed above.

4.5 Internal Roads as the Mechanism of Urban Intensification

Through examination of the parcel maps and building footprint maps, it can be seen that the entire process of urban development experienced the above described model pattern. Buildings were developed inside the block, the block grew around them from interior to exterior, and then internal access roads from public streets to the buildings were necessary. The model indicated that substantial development was made without preplanned internal roads, and the construction of buildings led to the creation of incoherent and organic paths. Given this situation, the network of internal paths succeeded the buildings rather than preceding them since they were generated according to building siting and design.

Figures 4.29 through 4.36 show how the internal roads were created following the construction of the buildings and how their ground area and ratio to the block area increased. Originally, the block was only accessible from its perimeter. Currently, the block is traversed by multiple circulation spaces. Compared with 0 sq ft in 1951, the total surface devoted to entire circulation system was 465,859 sq ft (43,280 sq m) or 16.41% of the block area in 2008. The clearly demarcated main internal roads connecting exterior public street system (shown as the black area in Figure 4.36) take up 197,094 sq

Figure 4.29 Internal Circulation System in the Tower Place Block and the Adjoining Block, 1951

Figure 4.30 Internal Circulation System in the Tower Place Block and the Adjoining Block, 1972

Figure 4.31 Internal Circulation System in the Tower Place Block and the Adjoining Block, 1979
(Tower Place Drive Shown as the Black Area)

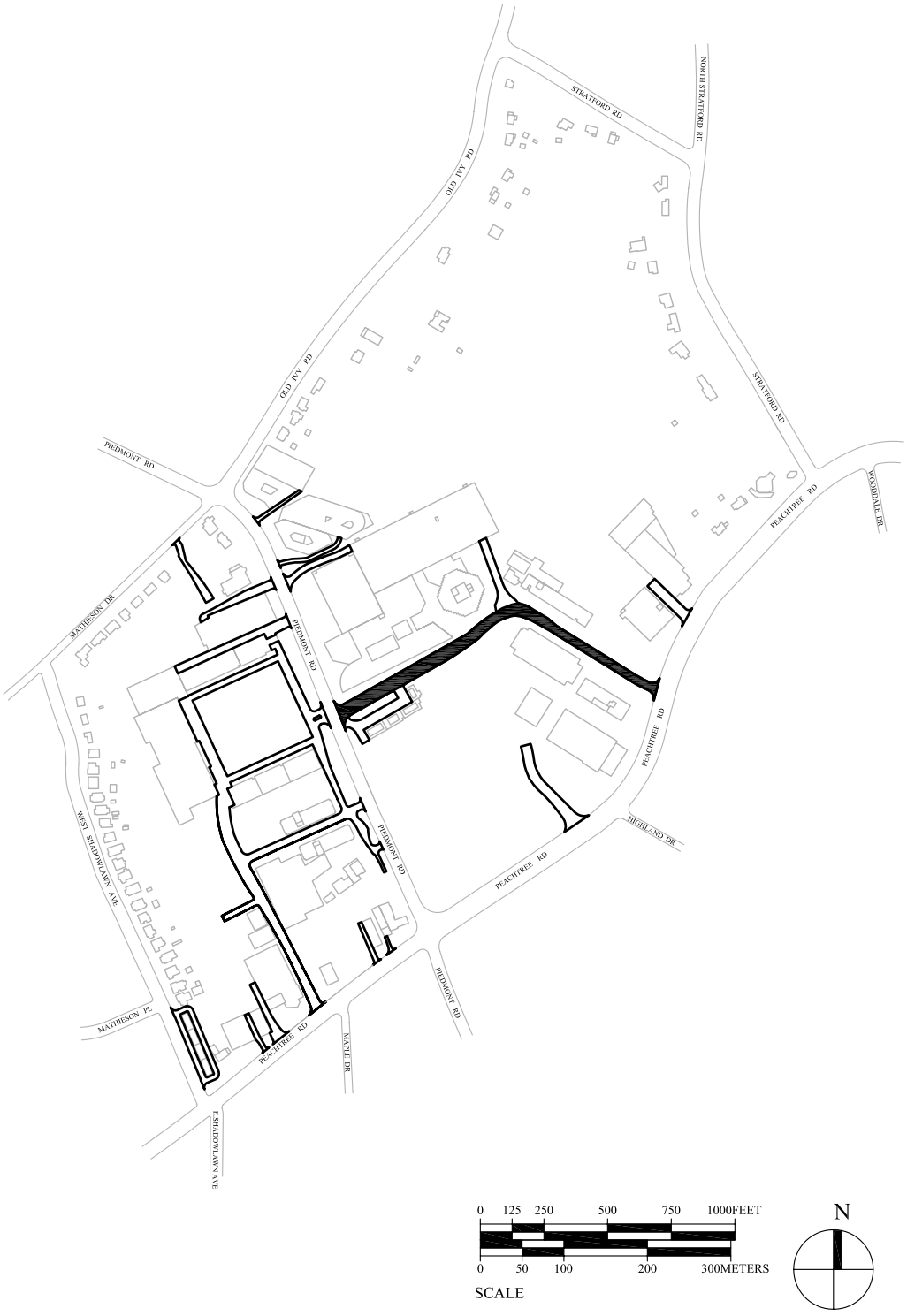


Figure 4.32 Internal Circulation System in the Tower Place Block and the Adjoining Block, 1988
(Tower Place Drive Shown as the Black Area)

Figure 4.33 Internal Circulation System in the Tower Place Block and the Adjoining Block, 1993
(Main Internal Roads Shown as the Black Area)

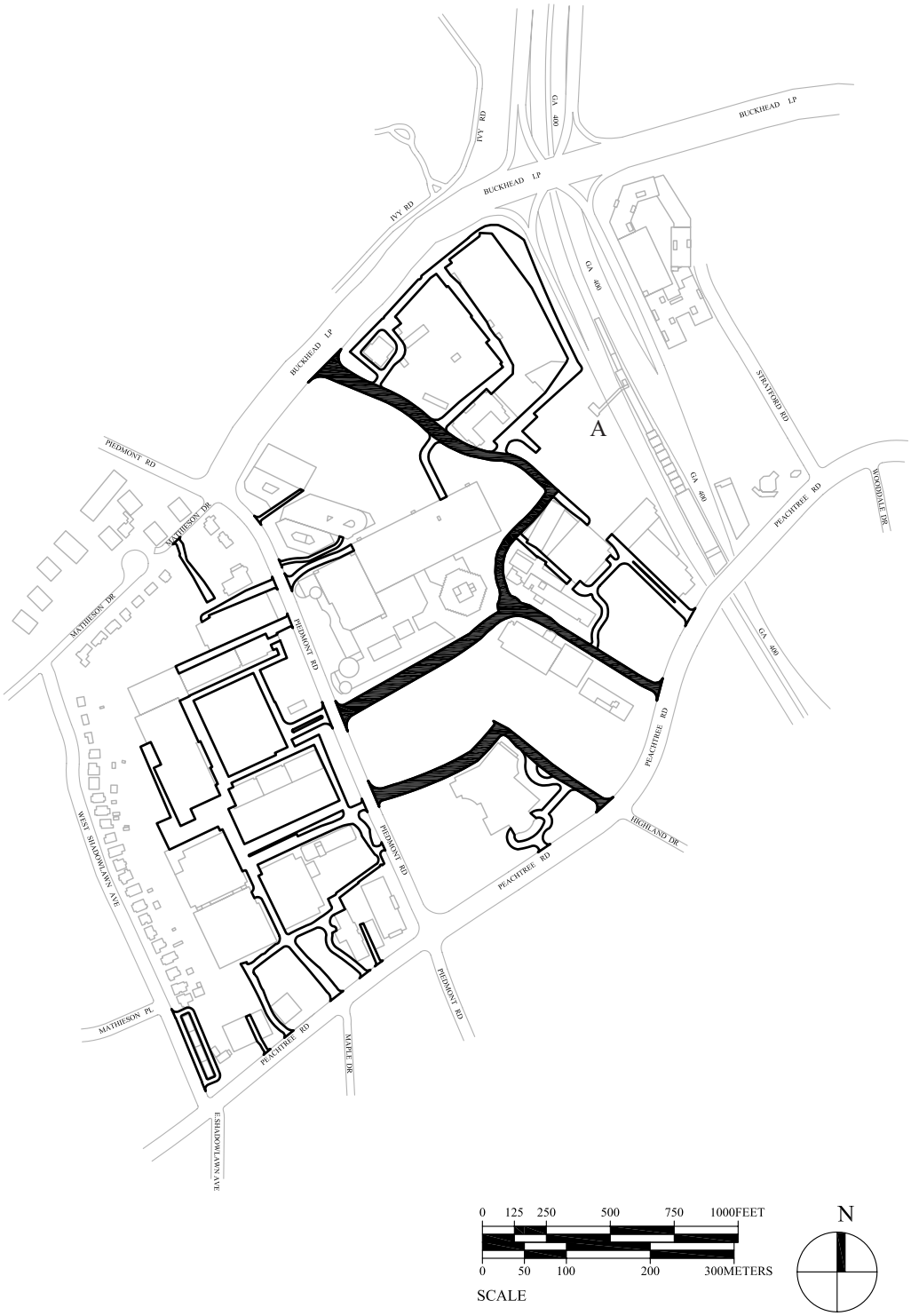


Figure 4.34 Internal Circulation System in the Tower Place Block and the Adjoining Block, 2000
(Main Internal Roads Shown as the Black Area)

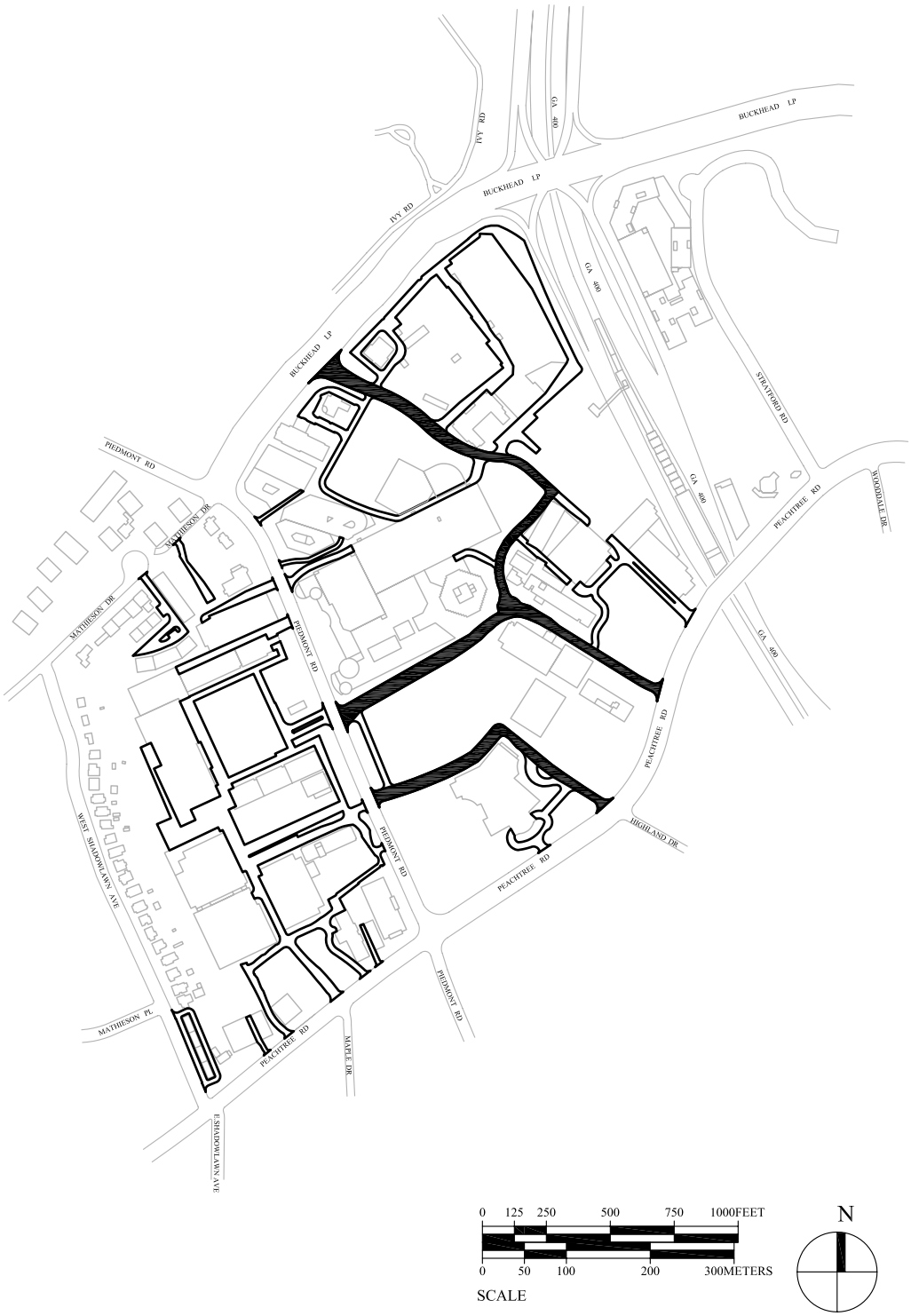


Figure 4.35 Internal Circulation System in the Tower Place Block and the Adjoining Block, 2005
(Main Internal Roads Shown as the Black Area)

Figure 4.36 Internal Circulation System in the Tower Place Block and the Adjoining Block, 2008
(Main Internal Roads Shown as the Black Area)

ft (18,311 sq m), or 6.94% of the block area. Comparing the street frontage and internal road frontage of every parcel at different times, the process by which the direct street access turned into the internal road access can be seen (Table 4.6). We notice that almost all parcels had street frontage in 1951, but 46.15% did not have direct street access in 2008. From the table, the average street frontage ratio (street frontage L(f) / perimeter of parcel P(p)) for each parcel dropped from 0.126 in 1951 to 0.110 in 2008 while the internal road frontage ratio (internal road frontage L(i) / perimeter of parcel P(p)) increased from 0 in 1951 to 0.251 in 2008. This indicates that the internal road access had already become the major access for the parcel.

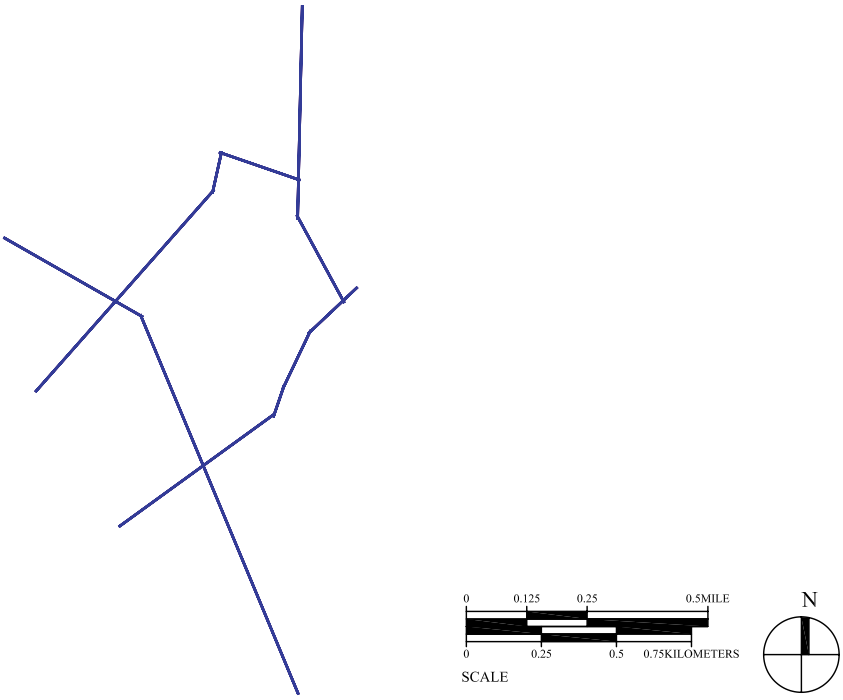
When the internal roads and circulation spaces are taken into account, the block appears to be divided into six sub-blocks. Two observations can be made from Figures 4.29 through 4.36. First, by 2000, a traversing route linking Peachtree Road to the Buckhead Loop and branching to Piedmont Road emerged. This was an extension of the original Tower Place Drive. Second, the block near the Peachtree-Piedmont intersection became intensely fragmented, which acts as a pole of attraction for additional frontage.

When we analyze the internal circulation system as part of the surrounding area, the syntactic integration of the location is such that internal streets appear among the most accessible lines of the axial map (Figure 4.37 to Figure 4.39). When the block is analyzed as an independent system we see that internal streets, whether in their 1979 condition or their current state, are not among the strongest integrators. At best, only the streets leading in from the periphery are integrated. In other words, as an independent system, the block is spatially introverted. This comes as no surprise, given that the internal circulation evolved without a plan with individual connections made without

anticipating future additional connections. The analysis meets intuition and points to a crucial ambiguity: location within the global urban system places the entire block on the integration core of the surrounding area. The local configuration of circulation, however, is centrifugal. It connects the interior to the perimeter without encouraging traversal. A deeper ambiguity lurks therein: the global order surrounding the site is public and makes the site eminently accessible. The local order inside the site is private and intended to take advantage of accessibility towards specific ends.

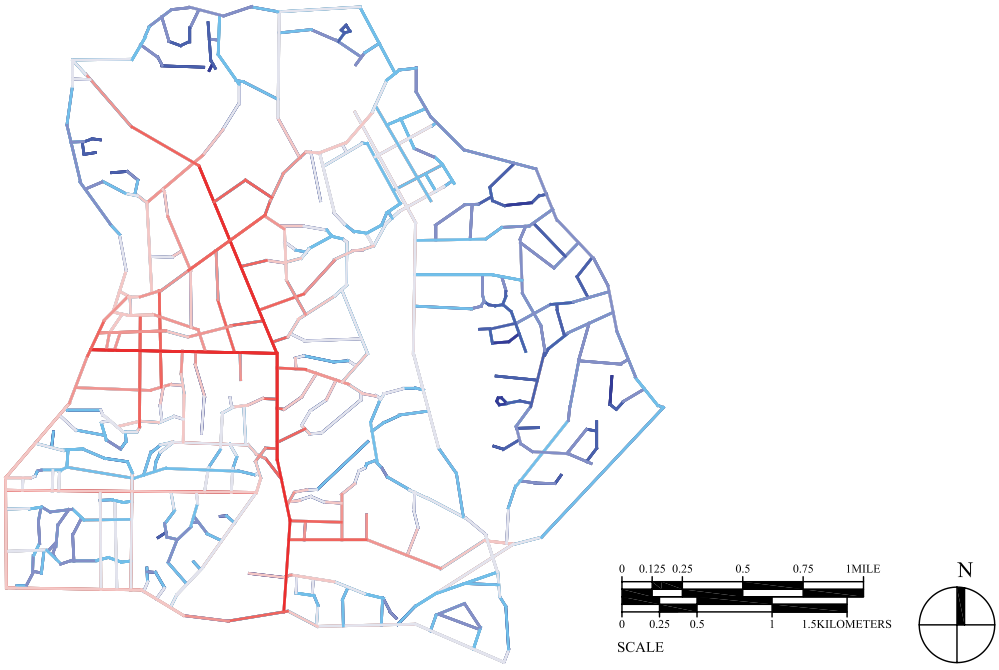
These tensions come out in a rather significant practice. A security gate is situated halfway along Tower Place Drive. It comes down to block through-traffic at 7:00am – 9:30am and 4:30pm – 6:30pm on weekdays. The most likely explanation is that the developers want to eliminate through traffic during rush hours, when the Buckhead Loop, Peachtree Road, and Piedmont Road are most congested and when drivers familiar with the area might look for shortcuts. The degree of congestion of the public roads, however, is associated with rather fundamental questions regarding urban growth. Based on this situation, another axial map is constructed showing the disconnection within the internal road system (Figure 4.40). On the other hand, pedestrian movement is seen as a potential generator of more businesses, thus the landowners agreed on the city's endeavor to install the pedestrian bridge from MARTA station to the inside of the block across the highway, as the "Buckhead Loopette" that parallels the Buckhead Loop about 400 feet south (A in Figure 4.34). With the issuance of required zoning approvals, it provided a pedestrian continuity from the Tower Place block to the development of the northwest across GA 400 South Bound, and created a north entrance to the Buckhead MARTA station. These efforts confirm that more

(a) Global Integration Map of Buckhead in 1951

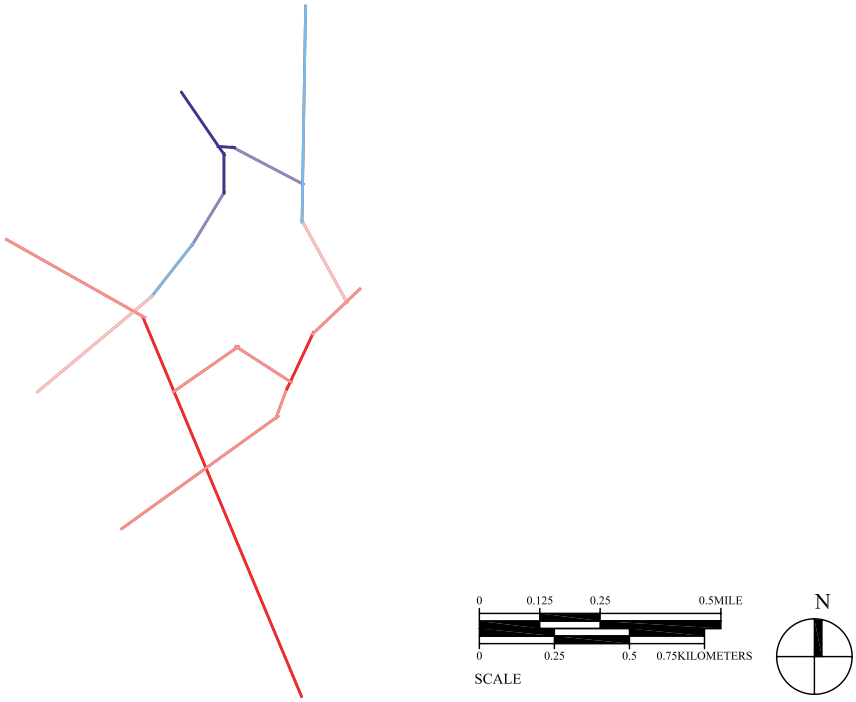


(b) Global Integration Map of the Antecedent of the Tower Place Block Buckhead in 1951

Figure 4.37 Global Integration Maps of Buckhead and the Antecedent of the Tower Place Block in 1951

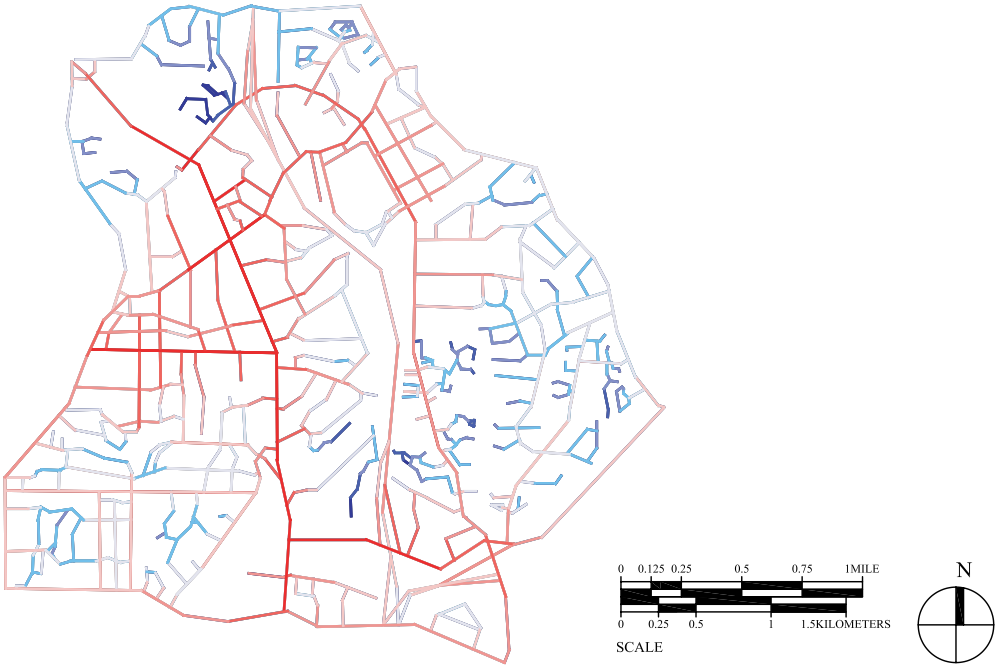


(a) Global Integration Map of Buckhead with
Main Internal Roads in 1979

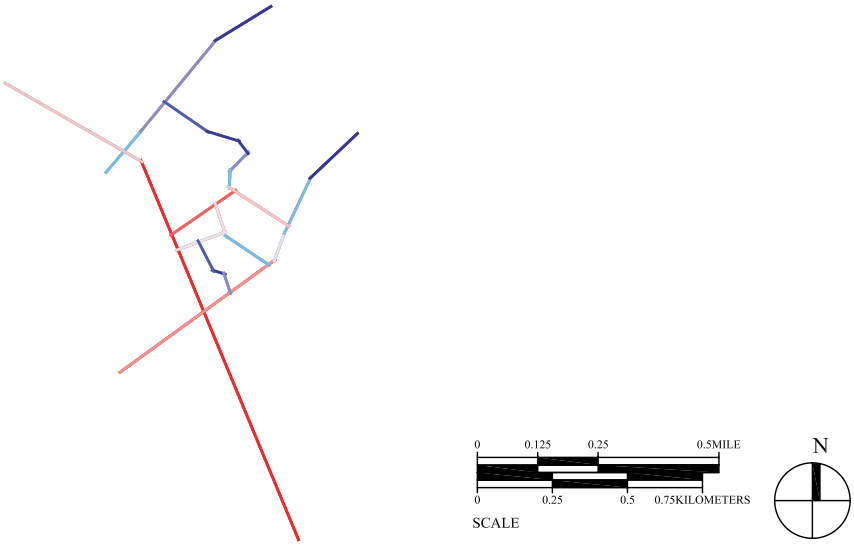


(b) Global Integration Map of the Tower Place Block with
Main Internal Roads in 1979

Figure 4.38 Global Integration Maps of Buckhead and the Tower Place Block
with Main Internal Roads in 1979

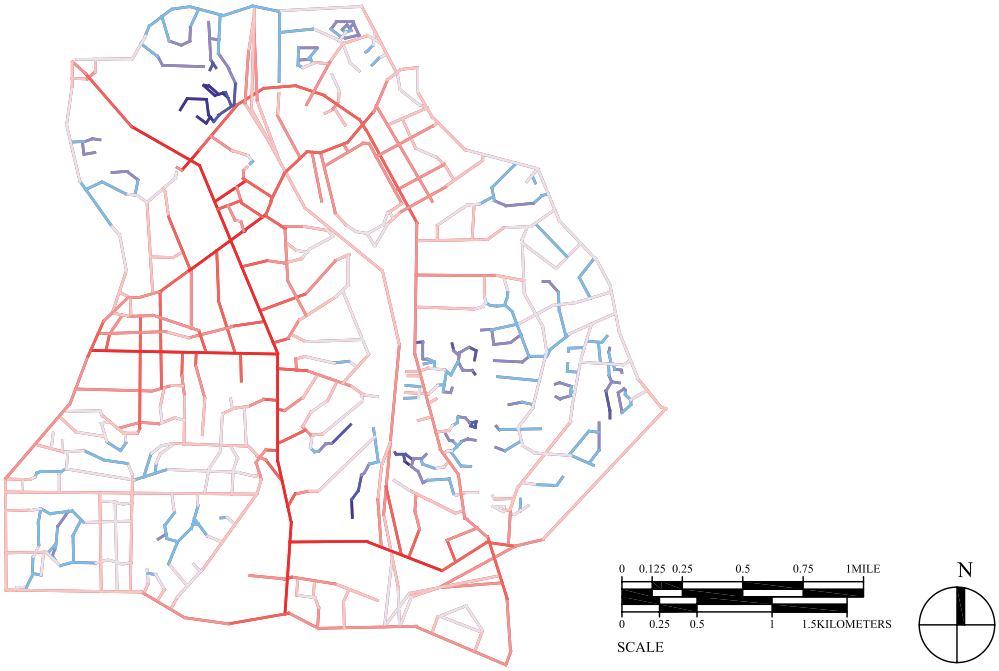


(a) Global Integration Map of Buckhead with
Main Internal Roads in 2008

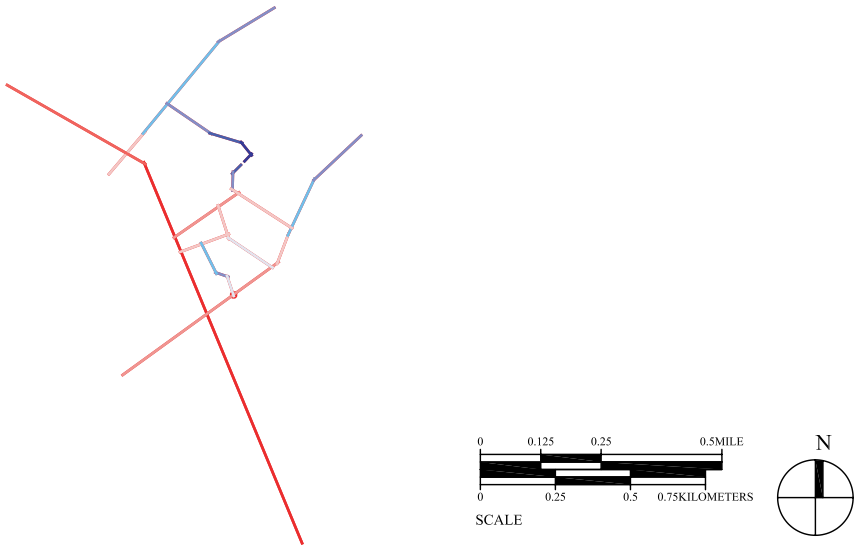


(b) Global Integration Map of the Tower Place Block with
Main Internal Roads in 2008

Figure 4.39 Global Integration Maps of Buckhead and the Tower Place Block
with Main Internal Roads in 2008



(a) Global Integration Map of Buckhead with Main Internal Roads in 2008 (When Security Gate is Down)



(b) Global Integration Map of the Tower Place Block with Main Internal Roads in 2008 (When Security Gate is Down)

Figure 4.40 Global Integration Maps of Buckhead and the Tower Place Block with Main Internal Roads in 2008 (When Security Gate is Down)

effective movement network for pedestrians is needed here. Here, the different actions were taken responding to vehicular and pedestrian movements respectively by the land owners. Some of these issues will be addressed in the last section.

4.6 Movement: Conflict and Reconciliation

Four physical elements of the block were discussed above, with special attention given to their interactions, especially the formation of the internal roads in the private domain. Internal roads created a denser syntax by dividing the large block into sub-blocks and providing a more efficient spatial layout for movement patterns for both vehicles and pedestrians. But since the roads are in the private realm, there might be conflict between public movement and private interests. In order to avoid the vehicular through-traffic from GA 400 and the Buckhead Loop to Peachtree and Piedmont roads and vice versa, there is a security gate installed within the block. This barrier is located in front of the Tower Place 200 building.

In order to examine the movement on the exterior public streets and the interior private roads, pedestrians and vehicles were counted at twelve "observation gates." The observation gates are distributed as shown in the maps (Figure 4.41), and include seven on the internal roads and five on the public streets. Vehicles and pedestrians were observed and counted in multiple time sessions. Each time session was 2.5 minutes long with 24 total sessions at each gate during the weekdays and weekends. The 24 time sessions were spread equally between 7:30 a.m. and 7:30 p.m. They covered the morning rush hour, the evening rush hour, lunch time, and all other times during the day. In order to compare, the sessions were divided into six two-hour sections (such as 7:30 a.m. –

9:30 a.m., 9:30 a.m. – 11:30 a.m., etc.). The total time for each observation gate, during the weekday or on the weekend, was one hour.

The aggregate movement counts are shown as Figure 4.42 for the weekday and Figure 4.43 for the weekend. Table 4.8 shows the comparison between weekday and weekend. Generally, the traffic on the public streets is heavier than on the internal roads. For vehicles during the weekday, the average one-hour count at each gate on the public streets was 2,259, while that number on the internal roads was 323. Thus, public street vehicle traffic was 7.80 times greater than internal road traffic. For pedestrians during the weekday, the average public street count was 154 and the internal street count was 107. Here, public street pedestrian traffic was 1.44 times greater than internal road traffic. The ratios for vehicle and pedestrian traffic during the weekend were 8.99 and 2.19, respectively. In other words, the structure of movement over the weekends is not much different from the structure of movement during the weekdays. However, it is clear that there is disparity between vehicle and pedestrian movement patterns.

Among the gates, gate 8 (located on Peachtree Road in front of the One Capital City Plaza building) had the most traffic, both vehicular and pedestrian, during the weekday and the most pedestrian traffic over the weekend. The traffic counts at gate 8 were compared with the other gate counts. Using gate 8 as a basis, Table 4.9 compares the vehicle and pedestrian traffic at each gate. Among the gates located in the private roads, gate 7 (located in front of Buckhead Church) has the most vehicular traffic during the weekdays and over the weekends. Gate 6 (in front of Tower Place 200) has the most pedestrian traffic during the weekdays, and Gate 2 (in front of Tower Place 100) has the most pedestrian traffic over the weekends.

Figure 4.41 Gate Locations of Movement Counts in the Tower Place Block and the Edge Streets

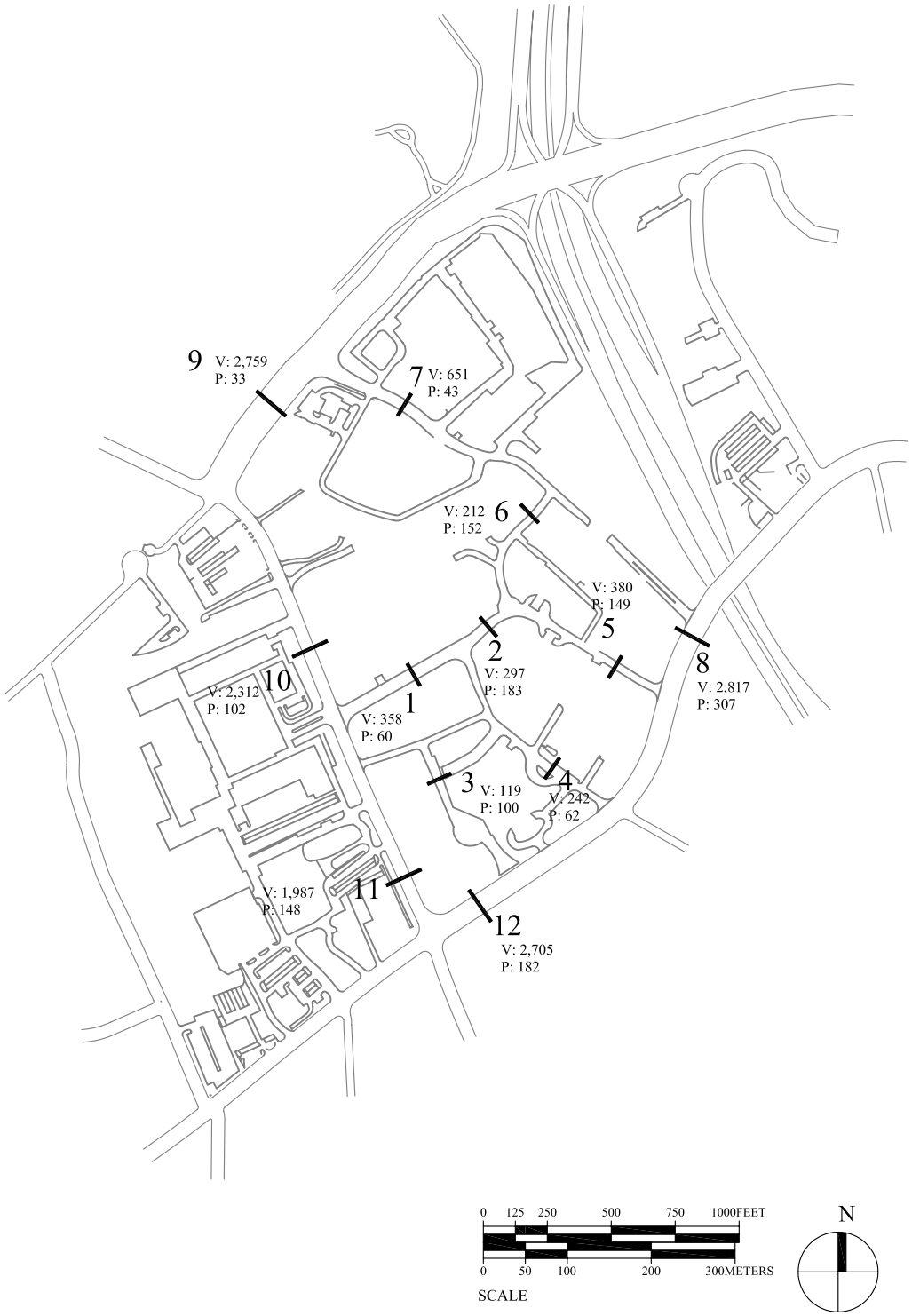


Figure 4.42 Aggregate Movement Count for Each Gate at Weekday

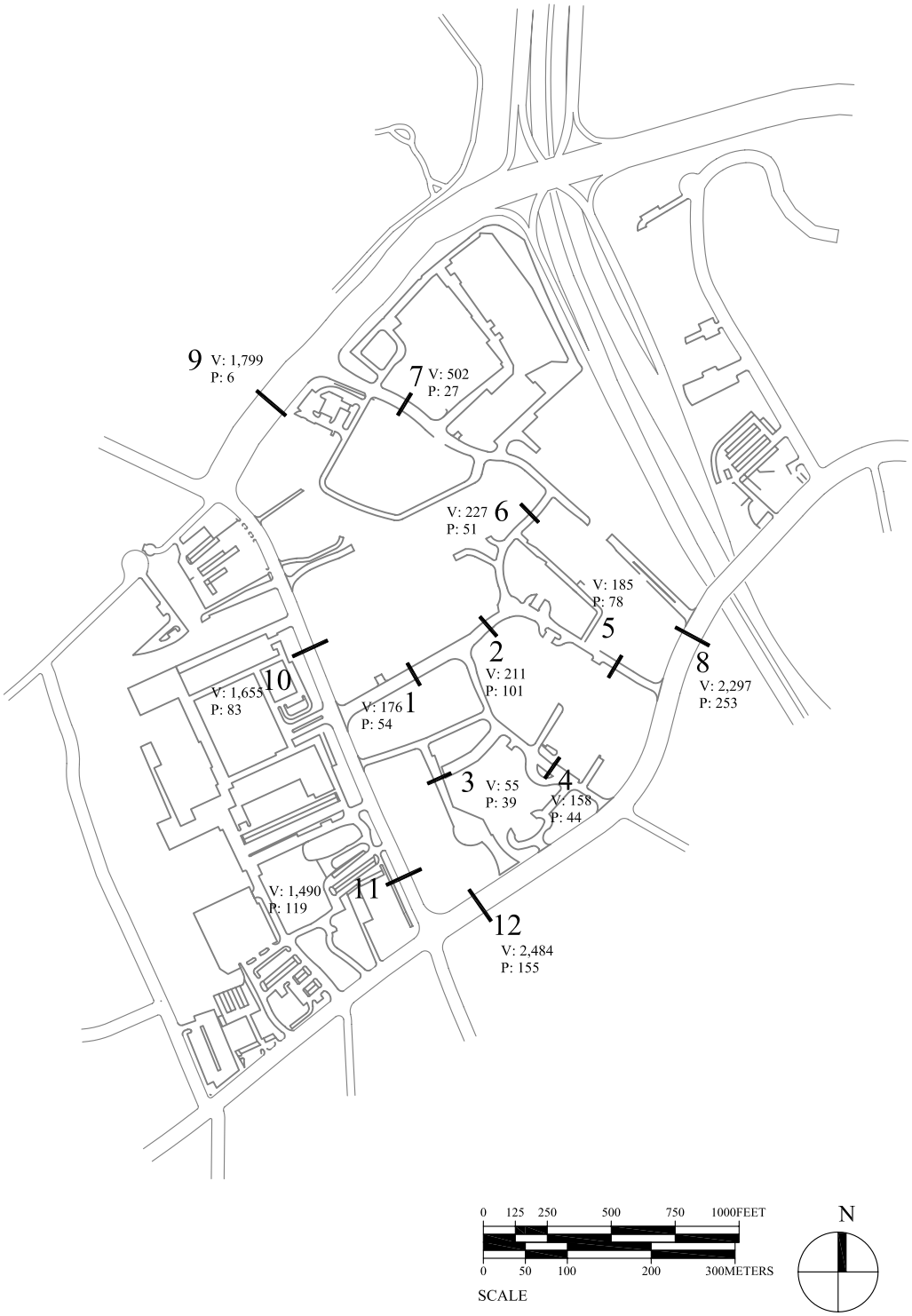


Figure 4.43 Aggregate Movement Count for Each Gate at Weekend

Table 4.8 Vehicle and Pedestrian Aggregate Movement Counts at Weekday and Weekend in the Tower Place Block

Gate	Location near Building	Vehicle		Pedestrian	
		Weekday	Weekend	Weekday	Weekend
1	Tower Walk	358	176	60	54
2	Tower Place 100	297	211	183	101
3	10 Terminus Place	119	55	100	39
4	Hyatt	242	158	62	44
5	AIU	380	185	149	78
6	Tower Place 200	212	227	152	51
7	Buckhead Church	651	502	43	27
8	One Capital City Plaza	2,817	2,297	307	253
9	SpringHill Suites	2,759	1,799	33	6
10	Tower Walk	2,312	1,655	102	83
11	10 Terminus Place	1,987	1,490	148	119
12	Terminus Place	2,705	2,484	182	155

Table 4.9 Vehicle and Pedestrian Aggregate Movement Ratios at Weekday and Weekend in the Tower Place Block

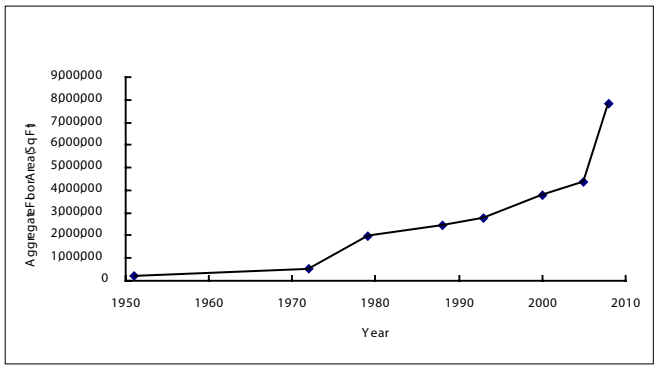
Gate	Location near Building	Vehicle		Pedestrian	
		Weekday	Weekend	Weekday	Weekend
1	Tower Walk	0.13	0.08	0.20	0.21
2	Tower Place 100	0.11	0.09	0.60	0.40
3	10 Terminus Place	0.04	0.02	0.33	0.15
4	Hyatt	0.09	0.07	0.20	0.17
5	AIU	0.13	0.08	0.49	0.31
6	Tower Place 200	0.08	0.10	0.50	0.20
7	Buckhead Church	0.23	0.22	0.14	0.11
8	One Capital City Plaza	1.00	1.00	1.00	1.00
9	SpringHill Suites	0.98	0.78	0.11	0.02
10	Tower Walk	0.82	0.72	0.33	0.33
11	10 Terminus Place	0.71	0.65	0.48	0.47
12	10 Terminus Place	0.96	1.08	0.59	0.61

These figures must consider the security gate position during the weekday. If the security gate is always open, what can be expected? There are two ways to predict the result. One is to calculate the average ratio of vehicular traffic at gate 6 to all traffic in the internal roads at other time periods. The value is 0.143. Based on this number, we can project the vehicular traffic if the security gate is open. The expected aggregate movement count for Gate 6 is 334. Alternatively, the ratio during the weekend was used as a reference with the result of 342. Both projections produce a ratio of about 12% with an average vehicular traffic count of 338 (334, 342). Compared with the original count of 212, the security gate prevented almost 60% of vehicle pass-through traffic, especially during the rush hours.

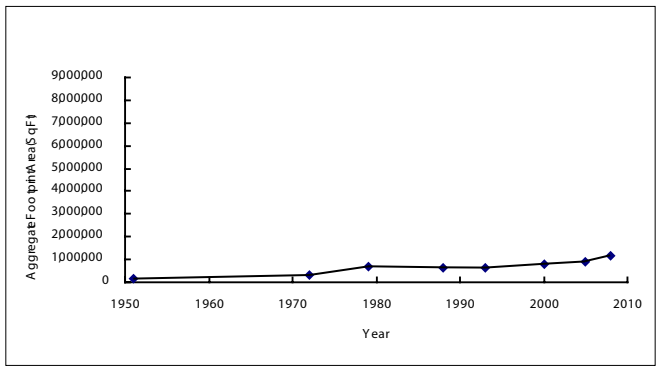
Due to the combined effect of development density, the presence of a MARTA station, and the mix of land uses, the Tower Place block supports a rather distributed pattern of pedestrian movement which is weaker towards the Buckhead Loop edge and stronger at the Peachtree Road edge and in the interior of the block. As it invites pedestrians in, the interior of the block seems threatened by the volume of the surrounding traffic, even as the volume of development has become more dependent on accessibility.

4.7 Discussion: Generation of New Dense Urbanism

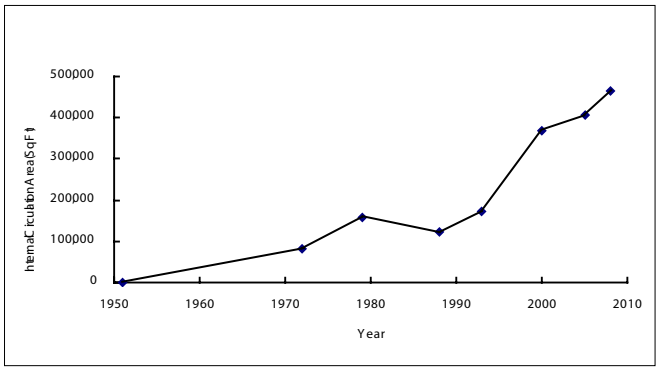
In over fifty years, the large sized Tower Place block has experienced very significant growth in all aspects of urban form, including land subdivisions, buildings and developments, and internal circulation network (Figure 4.44). Siksna has previously observed that large blocks tend to fragment as they get developed, so as to optimize access as well as frontage (Siksna 1997; 1998). Hillier has talked about how the



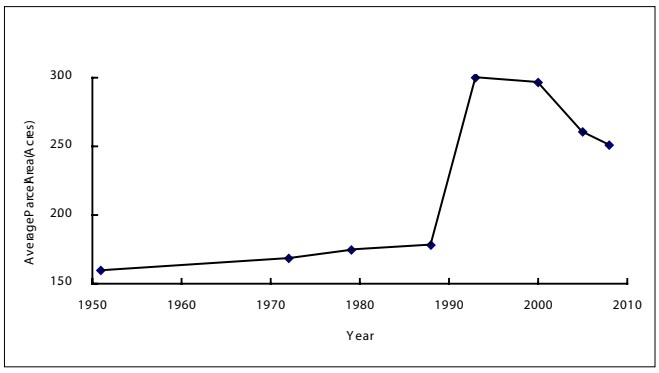
(a) Aggregate Floor Area Growth



(b) Aggregate Footprint Area Growth



(c) Internal Circulation Area Growth



(d) Average Parcel Area Growth

Figure 4.44 Urban Growth in the Tower Place Block from 1951 to 2008

"intensification" of the urban grid, that is the creation of a denser, well connected pattern of streets, is associated with the emergence of centers or urban activity, development, and liveliness (Hillier 1999a). To a large extent, the morphological history described here is a case study within the terms of reference set by these authors, but with important caveats. The distinction between public streets and private roads is emphasized here. And, more importantly, the distinction between opposite paths of development is emphasized. These paths involve buildings positioned with respect to streets versus streets arising to access buildings and later adjusted according to the disposition of buildings. The material presented shows that processes of block fragmentation and grid intensification can be associated with fundamentally different principles regarding the constitution of streets as the public framework for urban growth and change.

This study, however, also points to a deeper question, namely the relationship between local and global orders in urban growth. We can look at this relationship in different ways. First, from the point of view of spatial relationships, the Tower Place block benefits from high levels of global accessibility at different scales. The local order of circulation evolves to take advantage of this. Second, from the point of view of investment, global accessibility results from significant public investments in streets, in freeways, and in transit systems. Local circulation is privately funded and arranged according to private interests. What are the consequences of the articulation of global and local orders? Some preliminary discussion follows.

The first issue to consider is urban intelligibility. GA 400 is a freeway, a space of pure movement with no interface potential. Entering the Tower Place block from the Buckhead Loop, one experiences a deep sense of disjunction, as is typical in similar cases

elsewhere. A dense local space is entered without any initial awareness of the surroundings in which it is situated. The manner in which private roads are laid out, without regard to future extensions outside the block, exacerbates this sense of disjunction between global access and local arrangement. In other words, the rift between local and global orders, as experienced from the side of the Buckhead Loop, generates questions pertaining to intelligibility and cognition. Is the urban fabric to be understood in terms of continuity and differentiation or in terms of disjunction?

The second issue to consider is the impact of such patterns of development on public streets. Peachtree Road and Piedmont Road have been significantly widened over the period covered by this study to deal with increased traffic, a condition only further aggravated by the advent of GA 400 and the Buckhead Loop. As these streets became more oriented towards traffic, their interface potential has gradually been eroded. Only recently has the Peachtree Corridor project led to improvements along Peachtree Road with the creation of a median and the creation of generous sidewalks aimed at encouraging pedestrian movement and interface potential.[7] In short, the relationship between global and local orders raises tension as to whether public space can function as social space and as an interface of public and private behaviors or whether it will be reduced to a space of movement with all interface potential absorbed into private social

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[7] Atlanta Journal Constitution, 22 November 2007, page JE1: "For years, Peachtree Road in Buckhead has been one of Atlanta's glamour thoroughfares, at least in reputation. In reality, the road had turned into a bit of a mess. … But a half mile of Peachtree has gone under the knife in a $21 million overhaul that has dramatically changed the corridor's look and feel from just south of Piedmont Road to the GA 400 bridge. The corridor has been widened by 30 to 40 feet to allow for wider sidewalks, a landscaped media and turn lanes, bicycle lanes and a row of oak trees lining the street."

spaces. To say the least, not only does private development, such as illustrated in this case study, take advantage of public infrastructure, it also necessitates additional public expenditures to enable public streets to function as more than movement channels.

The third issue to consider is the manner in which history and spatial constraints impact urban growth. The very large blocks of Buckhead evolved when the area was still a sparsely inhabited residential suburb and continues today as the population density in contemporary Buckhead is only 14.46 people per hectare (Peponis et al. 2007b). Given these blocks, the pattern of contemporary development has proceeded according to prevailing zoning ordinances and subdivision regulations. The net effect of these regulations is that growth is not associated with the creation of an appropriate street framework that balances global and local requirements, and makes connections without detriment to the differentiation of urban areas by character and function. Thus, the inherited street network, coupled to the absence of subdivision regulations that might otherwise have prescribed the creation of new streets as a condition for dense development, acts as the major determinant of the process.

The fourth issue to consider is the conflict and reconciliation underlying the mechanism of urban growth. Clearly there are two different domains of urban space during the urban evolutionary process. Different layers of formal elements imposing on the structure of the urban fabric are interacting with each other and simultaneously are influenced by constraining factors. Conflicts will exist between the different interests of different domains or among different owners, so the formation of the urban fabric is the process of reconciliation as well.

Further study is needed to give these issues proper consideration. The working hypothesis, however, is rather simple. The Tower Place block illustrates a critical dilemma. Is contemporary urban growth oriented towards the creation of the city as a collective artifact supported by a framework of public spaces and public streets, or is it oriented towards the creation of disjointed realms connected by public transportation infrastructure? Over its recent history, the Tower Place block has pursued both paths of growth to varying degrees and for varying reasons. Thus, it becomes emblematic of some larger questions that are confronted in contemporary Atlanta.

CHAPTER 5

CONCLUSION: PATTERNS OF URBAN MORPHOGENESIS

In the introduction to this thesis the question was raised as to whether, as they evolve over time, the forms of urbanism associated with new urban centers, or edge cities, would converge or diverge relative to the urban forms of traditional cities. The concluding chapter addresses this question in the light of the evidence presented in the thesis. This is followed by a discussion of directions of future work.

5.1 Density, Accessibility and Spatial Structure: The Divergent Space Syntax of Edge Cities

Buckhead, Cumberland and Perimeter have grown in areas where the street network is sparse. Large and very large urban blocks are connected by curvilinear street patterns with cul-de-sacs often used to access their interior. Thus, the local pattern of connections tends to be poorly intelligible, and poorly integrated. Many direction changes are needed to get from one place to another, the distances between intersections are long, and the limited linear continuity of streets does not generate obvious orientation references. In this characteristic local context, the sense of global connection cannot efficiently rely on the few, linearly continuous older roads that may traverse the area, much as these occasional act as the only functional main spines and skeleton of reference—Roswell Road, Peachtree Road, Piedmont Road and Lenox Road would be examples in Buckhead, as Peachtree Dunwoody and Ashford Dunwoody would be examples in Perimeter. Instead, it comes to be dependent upon the use of major public infrastructure, mostly freeways and freeway intersection nodes; in some cases public

transportation is also present. All this means that edge cities emerge as accessible islands of large investments, taking advantage of the public infrastructure, not as parts of a coherent urban system. This, as we have seen, is fundamental to their identity, as perceived by many authors.

The large urban blocks allow large investments to proceed unfettered by the constraints of street intervals, or block, property sizes and shapes, which are typical in traditional cities. The shopping malls that are at the heart of the three areas investigated, illustrate a form of investment associated with extremely expansive building footprints, associated with equally expansive surface parking. Such footprints would probably not be possible to accommodate in traditional cities, and they would certainly be impractical from a financial point of view. When high rise buildings are attracted in the adjoining areas, they are planned in similar ways, with expansive footprints, as parts of clusters of similar buildings, intended to be commercialized as branded local communities. The large size of the blocks allows a complex process of redrawing of property boundaries, in many cases associated with changes in land subdivision and plot sizes and shapes, as shown in more detail through the example of the Tower Place block in Buckhead.

In chapters 2 and 3 it was shown that the unavoidable consequence of this pattern of development is the gradual emergence of a secondary network of private roads that can take many forms. In residential areas, these roads can take the form of enclaves and cul-de-sacs, as shown in greater detail in the case of Buckhead, making the primary street network appear even more fragmented, and the perimeter of the blocks even more irregular. In areas with more intensive high rise mixed use developments, these roads can form shortcuts of different kinds, from one edge of the block to another, they can add up

to a quasi-organic irregular network of passages, or they can form “ripples” of circulation around major building volumes.

The creation of such secondary road networks obeys some fundamental, and apparently invariant laws of space. Dense developments require the creation of new frontage, to make buildings situated deep in the block accessible; also to allow commercial premises to function as parts of a workable local system of circulation that distributes exchange opportunities as the patrons arriving by using the global infrastructure are distributed around the block. These requirements have been noted in the literature. Two arguments have specifically been emphasized in earlier chapters. One points to the wide spread tendency for large blocks to fragment when new urban centers arise. The other points to the tendency, typical in traditional cities, for the street network to become denser where land use develops more intensely. Based on all this, it is tempting to conclude that the edge cities display some pattern of convergence towards traditional urbanism. The analysis presented in earlier chapters, however, indicates that this rather superficial form of convergence conceals a more fundamental pattern of divergence which becomes more, not less, powerful with time.

The most fundamental persistent difference, of course, is one of social and constitutional logic. In traditional cities, the street network acts as the long term public framework for local investment decisions. As consistently noted in the literature since the late 60s, when architectural and planning theory “rediscovered” the street as the major constituent element of urbanism, street networks are the permanent trace of the city as land uses and patterns of architecture change. Hence even the discussion as to whether certain block sizes and street configurations are better able to absorb alternative

development patterns over time better than others. Given this fundamental reality, any process of adaptation that links street patterns to land uses evolves over time, and, more importantly, it evolves in a distributed mode, involving many decisions by many players. In edge cities, a strong rift exists between the system of public streets and the emergence of a social realm. The social realm, the sense of a shared domain, is based on private roads. More importantly, from a functional and configurational point of view, these private roads are designed to serve and access specific large scale investments. The way in which they may come to function as parts of an evolving network is not taken into account, and is certainly not anticipated by any institutionalized form of planning. In short, the patterns of circulation on the ground bear the marks of a fundamental logical and constitutional distinction that can be expressed as follows: in traditional urbanism the framework of development is the street network, and buildings follow streets. In edge city urbanism, the framework of development is the very large property near transportation infrastructure, and private roads follow building footprints.

One consequence of this fundamental divergence is the creation of connectivity patterns that may not accommodate, or encourage, flexible changes in land use over time. This arises from the fact that the circulation system is not designed to be intelligible in its own right, but remains subservient to the specific program of activity that it is initially created to serve. Roads are no longer constructed to be extended. As shown in Perimeter, of side of a very large urban block might be given over to residential enclaves and cult-de-sacs, with the other side occupied by intense mixed commercial uses, and with no connection between the two realms, other than through very circuitous routes that can be negotiated only by car.

The more fundamental consequence, however, is much more tangible on the ground at any given point in time and concerns the manner in which circulation is experienced on the ground. The emergent circulation system is not cognitively coherent due to the many direction changes and the limited patterns of continuity and linear extension. Even where the effect might be more picturesque than labyrinthine, at a very localized scale, there is no continuity between the emergent private roads and the pre-existing street system. Discontinuity is evident in two ways. First, much investment is inward looking rather than addressing the pre-existing streets. Second, even when we witness a shift towards a livelier interface between the streets surrounding the large urban blocks and the investments at their perimeter, there remains a fundamental tension. The streets are required to function as social domains while at the same time functioning as transportation channels. Very wide streets, however, are more likely to be experienced as barriers than as interfaces, especially when intersections are spaced widely apart to allow a more efficient traffic flow. This tension is endemic to the founding condition of edge cities, whereby a very sparse pre-existing street network is called to serve increasing densities of traffic, leading to cycles of additional traffic lanes followed by more congestion.

The general trends have been traced in much greater detail in the case of the Tower Place block. This is discussed in the next section.

5.2 The Large Urban Block as a Miniature of the City: The Tower Place Block

After more than fifty years of evolution, the Tower Place block has come to assemble all the ingredients of the city: residential high rises, retail stores, office towers, hotels, and a transit station. This pattern of dense, mixed land use conforms to current

ideas about walkable cities and transit oriented developments. The larger trends identified above, however, are all present in Tower Place block and give rise to a paradox central to its identity. From the land use point of view, it feels increasingly like a vibrant urban center. From the street layout point of view, it seems more like an island, with a complex internal circulation which discourages the casual passer-by to enter and explore.

The explanation for this paradox has been built throughout the course of the historical narrative. In the case of the Tower Place block, the turning point from the traditional to the new logic of urbanism occurred in the 1970s, specifically in the design and construction of the first large volume complex consisting of three buildings—the Tower Place Shopping Mall (later becoming the Tower Walk Shopping Center, B in Figure 4.22), the Tower Place Hotel (later becoming the Doubletree Hotel, C in Figure 4.22), and especially the featured skyscraper, Tower Place 100 (A in Figure 4.22).

The deep discontinuity in generative logic is made possible by several factors. First, the original condition of the street network affects the organization of patterns of movement around and through the site. The urban fabric of Buckhead concentrates traffic on a few congested main streets, which act like the necessary and often unique connections at both the local and larger metropolitan scales. One consequence of this is the pressure placed on the system of internal roads. There is a built-in incentive to use internal roads, which were designed to provide requisite access to private investments, as shortcuts between different parts of the surrounding public street infrastructure. This leads to ambiguities. Land owners and developers enjoy the advantages of strategic location and accessibility but try to control internal traffic—as indicated by the use of a security gate to block vehicular movement during critical rush hours. The structural

imbalance between congestion at the periphery and restricted internal traffic within the block seems endemic to the development. Only when it comes to pedestrian movement do we begin to sense a seamless continuity between the periphery and the center of the block. In fact, pedestrian volumes are highest on the Peachtree Road edge as well as on the central hub of the internal road system.

Second, the existing urban condition gives rise to continuing ambiguity regarding frontage and address. To compensate for the size of the urban block, the original plots were narrow and very deep. Thus, they did not lend themselves to large scale structures such as those sought by modern developments. The process of consolidating properties and changing plot boundaries was aimed at enabling large scale developments. However, as no internal street framework was ever agreed, there is a persistent ambiguity as to the orientation of buildings in relation to streets. The ambiguity is most explicitly expressed in the multiple addresses that sometimes characterize the same location, for example, 3340 Peachtree Road versus Tower Place 100 for the same property.

Third, the location advantage condition influences the evolution and underpins the character of the development as well. There exists the contrast between two location advantages. The block fronts the intersection between Peachtree Road and Piedmont Road, both signature streets of Atlanta. The block is accessible from GA 400. The first major development of the center of the block attempted to create linkages to Peachtree Road and Piedmont Road. Later growth, after the advent of GA 400, was aimed at capitalizing on the link to GA 400. In the late 1990s and the early 2000s, the Peachtree-Piedmont intersection was unoccupied and functioned as a side garden for the Nikko Hotel (later becoming the Grand Hyatt Hotel, A in Figure 4.24). Only recently have the

Terminus 100 (A in Figure 4.27) and 200 (under construction) developments come to reassert the significance of the street intersection as a major urban node. Therefore, the Tower Place block functions as not only the frontage of the major streets, but also the linkage between their intersections and the interstate system. The street frontage is on the local district scale and the interstate system is in the global urban context. Thus, the Tower Place block becomes the interface between both scales and structures. The manner in which this linkage is handled on the ground is ambiguous. The Tower Place block, however, represents a challenge and a potential. How can one weaver together local and global scales of connectivity in order to oppose the trend that Castells has described as "global connection and local disconnection?"

In the Tower Place block the question is fraught with paradox. On the one hand diverse modes and scales of accessibility are present on the ground. Furthermore, the Tower Place block would appear prone to function as a destination in its own right, or as part of chained trips involving the large malls, or the plethora of smaller scale commercial establishments in its vicinity. On the other hand, these modes of accessibility appear to arise in a haphazard manner and not to be subjected to a higher principle. The block does not yet suggest what the structure of future urbanism could be. It only exemplifies a condition with great potential.

5.3 Future Extension of the Study: Design Logic and Urban Morphogenesis

In this section four directions for the future extension of the current study are considered. The first concerns the details of the design logic underlying edge city development. The second concerns the extension of this work through more studies as thorough as the study of the Tower Place block. The third concerns the interaction

between design choices and objective constraints. The fourth concerns the discussion of regulatory frameworks that might be applied to direct future forms of urbanism.

Design logic in detail: The most important question to be studied further from the point of view of design logic is the extent of deliberate post-rationalization of existing conditions at each phase of development. While in traditional urbanism each plot can be developed independently of the adjoining plots, because the main shared reference is the street they commonly front, in edge city urbanism, each new development can more fundamentally affect pre-existing ones. This can take several forms, as illustrated in the Tower Place block. Sometimes an internal road is extended to provide additional frontage thus making pre-existing properties appear parts of a larger system; sometimes hierarchies of front and service access are reconciled across properties and sometimes they are not. The ground floor condition of buildings can evolve in response to changes in the vicinity and specifically to changes in flows of movements or distinctions of front and service access.

In the Tower Place block, the more recent developments make a more explicit attempt to post rationalize existing conditions in a manner that benefits the block as a whole. The newly constructed Terminus 100 complex, for example, not only generated another internal vehicle road connecting Piedmont and Peachtree Roads, but created a covered open space between two buildings, allowing pedestrians to flow into the interior of the block, on axis with a pre-existing hotel.

Additional case studies: Chapters 2 and 3 provided a first reconnaissance for the future development of additional case studies of detailed historical evolution, such as the study of the Tower Place block. The aim of additional studies would be to test whether

the evolution of the Tower Place block is representative of a broader process or specific to a particular condition. These studies could also lead to drawing a contrast between forms of edge city urbanism that are oriented towards a denser quasi-organic pattern of local connectivity, such as the one exemplified by the Tower Place block, versus a pattern of residential enclaves, such as the one exemplified by Pine Hills neighborhood around Lenox Road in Buckhead. These remain the most obviously contrasting forms of edge city urbanism.

Design choices and constraints: As we come to better document the processes and forms associated with edge cities, we might be better able to answer a fundamental question: how far are these processes and forms the result of design choices and preferences, and how far are they the result of objective constraints? Are there ways to design within existing regulatory frameworks and in the context of conditions such as those typical in the sites of edge cities in the early stages of development, which could lead to better futures? In short, are there better ways to design for growth and change while also creating a stable and intelligible structure of shared spaces? In order to address this question, it would be necessary to test whether practically identical programs could be accommodated on the same properties in more advantageous ways. Heuristically, this can be done through standard design workshops aimed at exploring alternative possibilities, with the advantage of hindsight, and in the hope of arriving at principles that could guide the future. More rigorously, this would require generative mathematical models that might generate alternative outline designs based on parametric constraints.

How can we develop appropriate regulatory frameworks? As this study has demonstrated, the emergence of edge cities is indissolubly linked to processes of rezoning, so that single family residential areas are made available for commercial development and mixed use dense development. Zoning regulations powerfully determine land uses, but they cannot quite powerfully determine the creation of street networks and frameworks of public space on the ground. Their implications are often mediated by standards of traffic engineering applied to road hierarchies. As we have seen, the application of traffic engineering to public infrastructure and the emergence of secondary roads on private properties lead to particular forms of urbanism, both intense and fragmented as well as poorly unintelligible, both accessible and poorly integrated into a coherent system.

Should we wish to encourage different evolutionary paths for edge cities urbanism, the regulatory instrument could well be provided by subdivision regulations. Many of the developments discussed here proceeded in the absence of subdivision regulations or with subdivision regulations that do not deliberately seek to address existing conditions and desirable futures. If we better understand the dynamics of edge cities urbanism, along the lines indicated by this thesis, we might be better able to develop subdivision regulations to facilitate more coherent forms of urbanism. It might then be possible to associate the application of subdivision regulations with processes of rezoning. These are matters well beyond the scope of this thesis. However, the work presented in this thesis points to the need to rethink planning and regulatory instruments in the light of morphological principles and morphological realities on the ground. This thesis is a preliminary step in this direction. What is needed, in the immediate future, is a

parallel study of the regulatory frameworks and the specific institutional decisions that have made the morphological processes documented in this thesis possible. Such a study would require considerable archival effort and field work. It is, however, indispensable.

APPENDIX A

PARCEL AND BUILDING DATA IN THE TOWER PLACE BLOCK

FROM 1951 TO 2008

Table A.1 Parcel and Building Data in the Tower Place Block, 1951

Parcel ID	Area (Sq. Ft.)	Area (Acre)	Perimeter (Ft.)	Shortest Side (Ft.)	Longest Side (Ft.)	Street Frontage (Ft.)	Internal Road Frontage (Ft.)	Perimeter of Circle with the same area A(p)	Compact-ness	Ratio of Shortest Side/Longest Side	Street Frontage Ratio	Internal Road Frontage Ratio
	S(p1)	S(p2)	P(p)	L(s)	L(l)	L(f)	L(i)	P(m)	P(p)/P(m)	L(s)/L(l)	L(f)/P(p)	L(i)/P(p)
1	38,465.16	0.88	843.46	143.40	293.92	398.23	0.00	695.25	1.213	0.488	0.472	0.000
2	24,717.71	0.57	738.82	82.02	276.44	124.93	0.00	557.33	1.326	0.297	0.169	0.000
3	31,675.30	0.73	837.38	104.92	313.41	104.92	0.00	630.91	1.327	0.335	0.125	0.000
4	25,529.15	0.59	794.42	32.90	305.91	101.91	0.00	566.40	1.403	0.108	0.128	0.000
5	39,609.67	0.91	1,023.26	102.61	408.08	102.61	0.00	705.51	1.450	0.251	0.100	0.000
6	13,221.26	0.30	477.37	103.35	162.48	103.35	0.00	407.61	1.171	0.636	0.216	0.000
7	24,619.06	0.57	754.94	131.69	319.87	319.87	0.00	556.21	1.357	0.412	0.424	0.000
8	53,823.57	1.24	1,107.24	127.02	433.93	127.02	0.00	822.41	1.346	0.293	0.115	0.000
9	46,832.82	1.08	1,027.14	95.72	404.75	95.72	0.00	767.15	1.339	0.236	0.093	0.000
10	104,541.85	2.40	2,180.04	12.85	365.20	0.00	0.00	1,146.17	1.902	0.035	0.000	0.000
11	32,883.74	0.75	1,086.46	75.52	487.52	75.52	0.00	642.83	1.690	0.155	0.070	0.000
12	53,453.54	1.23	1,246.75	102.88	567.50	102.88	0.00	819.58	1.521	0.181	0.083	0.000
13	48,959.05	1.12	1,077.27	96.85	437.64	96.85	0.00	784.37	1.373	0.221	0.090	0.000
14	64,286.25	1.48	1,463.36	106.05	660.56	106.05	0.00	898.80	1.628	0.161	0.072	0.000
15	34,155.04	0.78	817.90	100.00	302.82	100.00	0.00	655.14	1.248	0.330	0.122	0.000
16	78,836.39	1.81	1,663.34	128.34	756.00	128.34	0.00	995.33	1.671	0.170	0.077	0.000
17	38,653.07	0.89	884.15	100.00	332.18	100.00	0.00	696.94	1.269	0.301	0.113	0.000
18	78,386.99	1.80	1,819.67	100.87	845.28	100.87	0.00	992.49	1.833	0.119	0.055	0.000
19	156,380.05	3.59	2,050.30	180.65	845.28	180.65	0.00	1,401.83	1.463	0.214	0.088	0.000
20	45,288.77	1.04	1,017.06	102.84	398.04	102.84	0.00	754.40	1.348	0.258	0.101	0.000
21	51,082.49	1.17	1,072.90	93.41	424.18	93.41	0.00	801.20	1.339	0.220	0.087	0.000
22	77,315.31	1.77	1,817.83	80.48	813.95	116.28	0.00	985.68	1.844	0.099	0.064	0.000
23	41,777.08	0.96	1,040.62	42.14	424.18	100.00	0.00	724.56	1.436	0.099	0.096	0.000
24	70,803.64	1.63	1,784.66	98.21	807.13	98.21	0.00	943.26	1.892	0.122	0.055	0.000
25	20,068.68	0.46	919.76	50.00	415.98	50.00	0.00	502.19	1.832	0.120	0.054	0.000
26	72,857.23	1.67	1,759.67	94.27	793.50	94.27	0.00	956.84	1.839	0.119	0.054	0.000
27	33,280.53	0.76	946.69	56.09	401.98	95.83	0.00	646.70	1.464	0.140	0.101	0.000
28	102,343.63	2.35	2,057.81	99.90	921.45	123.92	0.00	1,134.06	1.815	0.108	0.060	0.000
29	69,649.01	1.60	1,712.89	96.21	771.89	96.21	0.00	935.54	1.831	0.125	0.056	0.000
30	31,798.59	0.73	946.60	82.00	344.40	82.00	0.00	632.13	1.497	0.238	0.087	0.000

Table A.1 (continued)

Parcel ID	Area (Sq. Ft.)	Area (Acre)	Perimeter (Ft.)	Shortest Side (Ft.)	Longest Side (Ft.)	Street Frontage (Ft.)	Internal Road Frontage (Ft.)	Perimeter of Circle with the same area A(p)	Compact-ness	Ratio of Shortest Side/Longest Side	Street Frontage Ratio	Internal Road Frontage Ratio
	S(p1)	S(p2)	P(p)	L(s)	L(l)	L(f)	L(i)	P(m)	P(p)/P(m)	L(s)/L(l)	L(f)/P(p)	L(i)/P(p)
31	95,645.89	2.20	2,055.81	103.59	926.81	103.59	0.00	1,096.32	1.875	0.112	0.050	0.000
32	13,877.12	0.32	528.91	70.28	193.64	70.28	0.00	417.59	1.267	0.363	0.133	0.000
33	109,667.85	2.52	1,378.68	200.13	469.31	564.97	0.00	1,173.94	1.174	0.426	0.410	0.000
34	285,700.80	6.56	2,529.32	301.96	999.44	301.96	0.00	1,894.79	1.335	0.302	0.119	0.000
35	14,660.61	0.34	541.19	75.22	197.31	75.22	0.00	429.22	1.261	0.381	0.139	0.000
36	147,596.77	3.39	1,649.26	353.27	559.95	0.00	0.00	1,361.89	1.211	0.631	0.000	0.000
37	14,940.12	0.34	548.66	75.23	201.10	75.23	0.00	433.29	1.266	0.374	0.137	0.000
38	15,182.68	0.35	555.96	75.00	205.08	75.00	0.00	436.80	1.273	0.366	0.135	0.000
39	205,451.43	4.72	2,430.03	107.01	999.44	179.90	0.00	1,606.79	1.512	0.107	0.074	0.000
40	19,560.44	0.45	648.31	53.83	180.05	151.00	0.00	495.79	1.308	0.299	0.233	0.000
41	102,122.92	2.34	1,890.39	126.27	824.92	126.27	0.00	1,132.83	1.669	0.153	0.067	0.000
42	23,513.93	0.54	688.80	47.92	222.74	185.94	0.00	543.58	1.267	0.215	0.270	0.000
43	81,931.46	1.88	1,260.44	212.78	462.51	242.76	0.00	1,014.68	1.242	0.460	0.193	0.000
44	170,248.60	3.91	2,250.60	156.47	976.45	156.47	0.00	1,462.67	1.539	0.160	0.070	0.000
45	94,148.27	2.16	1,838.39	100.26	809.94	100.26	0.00	1,087.70	1.690	0.124	0.055	0.000
46	97,557.48	2.24	1,814.27	125.49	788.33	125.49	0.00	1,107.22	1.639	0.159	0.069	0.000
47	95,544.52	2.19	1,782.00	125.43	772.59	125.43	0.00	1,095.74	1.626	0.162	0.070	0.000
48	159,709.12	3.67	1,856.16	274.18	706.80	274.18	0.00	1,416.67	1.310	0.388	0.148	0.000
49	162,702.82	3.74	1,941.34	189.41	756.12	254.00	0.00	1,429.89	1.358	0.251	0.131	0.000
50	152,985.81	3.51	1,899.95	189.17	741.81	244.12	0.00	1,386.53	1.370	0.255	0.128	0.000
51	58,924.98	1.35	1,253.87	98.74	527.07	138.39	0.00	860.51	1.457	0.187	0.110	0.000
52	42,371.57	0.97	1,222.14	66.27	532.45	96.34	0.00	729.70	1.675	0.124	0.079	0.000
53	35,097.48	0.81	1,192.51	50.82	532.45	84.71	0.00	664.11	1.796	0.095	0.071	0.000
54	96,664.99	2.22	1,408.44	143.71	524.53	235.72	0.00	1,102.15	1.278	0.274	0.167	0.000
55	37,566.59	0.86	953.97	100.03	386.03	102.61	0.00	687.08	1.388	0.259	0.108	0.000
56	40,331.31	0.93	1,006.65	100.00	404.45	100.00	0.00	711.91	1.414	0.247	0.099	0.000
57	40,103.71	0.92	1,002.10	100.00	399.90	100.00	0.00	709.90	1.412	0.250	0.100	0.000
58	19,628.82	0.45	595.19	100.03	206.60	100.03	0.00	496.65	1.198	0.484	0.168	0.000
59	65,198.19	1.50	1,003.17	192.40	299.87	496.69	0.00	905.15	1.108	0.642	0.495	0.000

Table A.1 (continued)

Parcel ID	Building Name	Address	Building Use	Footprint Area (Sq. Ft.)	Total Floor Area (Sq. Ft.)	Floor Area Ratio	Year Built	Number of Floors
				S(f)	S(t)	FAR		
1	3695 Buckhead Loop	3695 Buckhead Loop	Residence	830	830	0.022		1
2	3592 Stratford Rd	3592 Stratford Rd	Residence	2,000	2,000	0.081		1
3	3585 Buckhead Loop	3585 Buckhead Loop	Residence	1,800	2,500	0.079		2
4	3580 Stratford Rd	3580 Stratford Rd	Residence	1,300	2,200	0.086		2
5	3575 Buckhead Loop	3575 Buckhead Loop	Residence	1,650	2,500	0.063		2
6	3570 Stratford Rd	3570 Stratford Rd	Residence	1,100	2,000	0.151		2
7	No Building	3464 Peachtree Rd	N/A	0	0	0.000		0
8	3561 Buckhead Loop	3561 Buckhead Loop	Residence	1,650	2,500	0.046		2
9	3460 Stratford Rd	3460 Stratford Rd	Residence	2,000	2,000	0.043		1
10	No Building	N/A	N/A	0	0	0.000		0
11	3555 Buckhead Loop	3555 Buckhead Loop	Residence	1,850	1,850	0.056		1
12	3539 Buckhead Loop	3539 Buckhead Loop	Residence	1,900	2,500	0.047		2
13	3450 Stratford Rd	3450 Stratford Rd	Residence	1,600	1,600	0.033		1
14	No Building	3529 Buckhead Loop	N/A	0	0	0.000		0
15	3442 Stratford Rd	3442 Stratford Rd	Residence	2,400	2,400	0.070		1
16	3525 Buckhead Loop	3525 Buckhead Loop	Residence	2,000	2,000	0.025		1
17	3438 Stratford Rd	3438 Stratford Rd	Residence	2,200	2,200	0.057		1
18	No Building	3521 Buckhead Loop	N/A	0	0	0.000		0
19	3507 Buckhead Loop	3507 Buckhead Loop	Residence	3,850	3,850	0.025		1
20	3428 Stratford Rd	3428 Stratford Rd	Residence	2,150	2,150	0.047		1
21	3420 Stratford Rd	3420 Stratford Rd	Residence	2,200	2,200	0.043		1
22	3497 Buckhead Loop	3497 Buckhead Loop	Residence	3,100	3,100	0.040		1
23	3414 Stratford Rd	3414 Stratford Rd	Residence	2,800	2,800	0.067		1
24	3487 Buckhead Loop	3487 Buckhead Loop	Residence	1,800	1,800	0.025		1
25	No Building	3410 Stratford Rd	N/A	0	0	0.000		0
26	No Building	3477 Buckhead Loop	N/A	0	0	0.000		0
27	3390-3400 Stratford Rd	3390-3400 Stratford Rd	Residence	3,600	3,600	0.108		1
28	3368 Peachtree Rd	3368 Peachtree Rd	Residence	2,100	3,300	0.032		2
29	3471 Buckhead Loop	3471 Buckhead Loop	Residence	1,500	1,500	0.022		1
30	3390-3400 Stratford Rd	3390-3400 Stratford Rd	Residence	0	0	0.000		1

Table A.1 (continued)

Parcel ID	Building Name	Address	Building Use	Footprint Area (Sq. Ft.)	Total Floor Area (Sq. Ft.)	Floor Area Ratio	Year Built	Number of Floors
				S(f)	S(t)	FAR		
31	3350 Peachtree Rd	3350 Peachtree Rd	Residence	1,950	3,000	0.031		2
32	3467 Buckhead Loop	3467 Buckhead Loop	Residence	1,500	1,500	0.108		1
33	Second Church of Christ Scientist	3372 Peachtree Rd	Church	6,800	8,600	0.078		2
34	3350 Peachtree Rd	3350 Peachtree Rd	Residence	2,800	4,800	0.017		2
35	3459 Buckhead Loop	3459 Buckhead Loop	Residence	2,000	2,000	0.136		1
36	3336 Peachtree Rd	3336 Peachtree Rd	Residence	1,600	1,600	0.011		1
37	3455 Buckhead Loop	3455 Buckhead Loop	Residence	2,000	2,000	0.134		1
38	3445 Buckhead Loop	3445 Buckhead Loop	Residence	2,400	2,400	0.158		1
39	3348 Peachtree Rd	3348 Peachtree Rd	Residence	3,400	3,400	0.017		1
40	3435 Buckhead Loop	3435 Buckhead Loop	Residence	2,000	2,000	0.102		1
41	3399 Piedmont Rd	3399 Piedmont Rd	Residence	4,150	4,150	0.041		1
42	3423 Piedmont Rd	3423 Piedmont Rd	Residence	2,350	2,350	0.100		1
43	3405 Piedmont Rd	3405 Piedmont Rd	Residence	6,000	6,000	0.073		1
44	3340 Peachtree Rd	3340 Peachtree Rd	Residence	3,400	3,800	0.022		2
45	No Building	3351 Piedmont Rd	N/A	0	0	0.000		0
46	3381 Piedmont Rd	3381 Piedmont Rd	Residence	3,900	5,500	0.056		2
47	3361 Piedmont Rd	3361 Piedmont Rd	Residence	3,900	5,900	0.062		2
48	3338 Peachtree Rd	3338 Peachtree Rd	Residence	5,500	7,200	0.045		2
49	3349-3355 Piedmont Rd	3349-3355 Piedmont Rd	Residence	5,000	7,000	0.043		2
50	R.L. Hope School	3315 Piedmont Rd	School	20,000	40,000	0.261	1925	2
51	3316 Peachtree Rd	3316 Peachtree Rd	Residence	2,100	3,800	0.064		2
52	3300 peachtree Rd	3300 Peachtree Rd	Residence	2,700	2,700	0.064		1
53	3278 Peachtree	3278 Peachtree Rd	Residence	2,600	2,600	0.074		1
54	No Building	3272 Peachtree Rd	Residence	0	0	0.000		0
55	3313 Piedmont Rd	3313 Piedmont Rd	Residence	1,000	1,000	0.027		1
56	No Building	3270 Peachtree Rd	N/A	0	0	0.000		0
57	3264 Peachtree Rd	3264 Peachtree Rd	Residence	3,600	5,300	0.132		2
58	No Building	3299 Piedmont Rd	N/A	0	0	0.000		0
59	3260 Peachtree Rd	3260 Peachtree Rd	Residence	6,200	9,500	0.146		2

Table A.2 Parcel and Building Data in the Tower Place Block, 1972

Parcel ID	Area (Sq. Ft.)	Area (Acre)	Perimeter (Ft.)	Shortest Side (Ft.)	Longest Side (Ft.)	Street Frontage (Ft.)	Internal Road Frontage (Ft.)	Perimeter of Circle with the same area A(p)	Compact-ness	Ratio of Shortest Side/Longest Side	Street Frontage Ratio	Internal Road Frontage Ratio
	S(p1)	S(p2)	P(p)	L(s)	L(l)	L(f)	L(i)	P(m)	P(p)/P(m)	L(s)/L(l)	L(f)/P(p)	L(i)/P(p)
1	38,465.16	0.88	843.46	143.40	293.92	398.23	0.00	695.25	1.213	0.488	0.472	0.000
2	24,717.71	0.57	738.82	82.02	276.44	124.93	0.00	557.33	1.326	0.297	0.169	0.000
3	31,675.30	0.73	837.38	104.92	313.41	104.92	0.00	630.91	1.327	0.335	0.125	0.000
4	25,529.15	0.59	794.42	32.90	305.91	101.91	0.00	566.40	1.403	0.108	0.128	0.000
5	39,609.67	0.91	1,023.26	102.61	408.08	102.61	0.00	705.51	1.450	0.251	0.100	0.000
6	13,221.26	0.30	477.37	103.35	162.48	103.35	0.00	407.61	1.171	0.636	0.216	0.000
7	24,619.06	0.57	754.94	131.69	319.87	319.87	0.00	556.21	1.357	0.412	0.424	0.000
8	53,823.57	1.24	1,107.24	127.02	433.93	127.02	0.00	822.41	1.346	0.293	0.115	0.000
9	46,832.82	1.08	1,027.14	95.72	404.75	95.72	0.00	767.15	1.339	0.236	0.093	0.000
10	104,541.85	2.40	2,180.04	12.85	365.20	0.00	0.00	1,146.17	1.902	0.035	0.000	0.000
11	32,883.74	0.75	1,086.46	75.52	487.52	75.52	0.00	642.83	1.690	0.155	0.070	0.000
12	53,453.54	1.23	1,246.75	102.88	567.50	102.88	0.00	819.58	1.521	0.181	0.083	0.000
13	48,959.05	1.12	1,077.27	96.85	437.64	96.85	0.00	784.37	1.373	0.221	0.090	0.000
14	64,286.25	1.48	1,463.36	106.05	660.56	106.05	0.00	898.80	1.628	0.161	0.072	0.000
15	34,155.04	0.78	817.90	100.00	302.82	100.00	0.00	655.14	1.248	0.330	0.122	0.000
16	111,270.18	2.55	1,948.49	106.94	660.56	106.94	0.00	1,182.48	1.648	0.162	0.055	0.000
17	45,953.20	1.05	1,051.90	109.35	414.94	122.27	0.00	759.91	1.384	0.264	0.116	0.000
18	38,653.07	0.89	884.15	100.00	332.18	100.00	0.00	696.94	1.269	0.301	0.113	0.000
19	215,078.12	4.94	2,242.40	95.17	845.28	296.87	0.00	1,644.00	1.364	0.113	0.132	0.000
20	45,288.77	1.04	1,017.06	102.84	398.04	102.84	0.00	754.40	1.348	0.258	0.101	0.000
21	51,082.49	1.17	1,072.90	93.41	424.18	93.41	0.00	801.20	1.339	0.220	0.087	0.000
22	41,777.08	0.96	1,040.62	42.14	424.18	100.00	0.00	724.56	1.436	0.099	0.096	0.000
23	89,420.89	2.05	1,947.78	98.21	793.50	98.21	0.00	1,060.04	1.837	0.124	0.050	0.000
24	20,068.68	0.46	919.76	50.00	415.98	50.00	0.00	502.19	1.832	0.120	0.054	0.000
25	72,857.23	1.67	1,759.67	94.27	793.50	94.27	0.00	956.84	1.839	0.119	0.054	0.000
26	33,280.54	0.76	946.69	56.09	401.98	95.83	0.00	646.70	1.464	0.140	0.101	0.000
27	102,343.63	2.35	2,057.81	99.90	921.45	123.92	0.00	1,134.06	1.815	0.108	0.060	0.000
28	69,649.01	1.60	1,712.89	96.21	771.89	96.21	0.00	935.54	1.831	0.125	0.056	0.000

Table A.2 (continued)

Parcel ID	Area (Sq. Ft.)	Area (Acre)	Perimeter (Ft.)	Shortest Side (Ft.)	Longest Side (Ft.)	Street Frontage (Ft.)	Internal Road Frontage (Ft.)	Perimeter of Circle with the same area A(p)	Compact-ness	Ratio of Shortest Side/Longest Side	Street Frontage Ratio	Internal Road Frontage Ratio
	S(p1)	S(p2)	P(p)	L(s)	L(l)	L(f)	L(i)	P(m)	P(p)/P(m)	L(s)/L(l)	L(f)/P(p)	L(i)/P(p)
29	31,798.59	0.73	946.60	82.00	344.40	82.00	0.00	632.13	1.497	0.238	0.087	0.000
30	95,645.89	2.20	2,055.81	103.59	926.81	103.59	0.00	1,096.32	1.875	0.112	0.050	0.000
31	18,146.30	0.42	644.05	70.28	193.64	70.28	0.00	477.53	1.349	0.363	0.109	0.000
32	109,667.85	2.52	1,378.68	200.13	469.31	564.97	0.00	1,173.94	1.174	0.426	0.410	0.000
33	285,700.80	6.56	2,529.32	301.96	999.44	301.96	0.00	1,894.79	1.335	0.302	0.119	0.000
34	18,622.49	0.43	647.05	75.22	197.31	75.22	0.00	483.75	1.338	0.381	0.116	0.000
35	130,239.82	2.99	1,543.45	353.27	559.95	0.00	0.00	1,279.31	1.206	0.631	0.000	0.000
36	18,610.02	0.43	646.73	75.23	201.10	75.23	0.00	483.59	1.337	0.374	0.116	0.000
37	18,550.20	0.43	646.26	75.00	205.08	75.00	0.00	482.81	1.339	0.366	0.116	0.000
38	193,728.03	4.45	2,478.10	48.26	999.44	179.90	0.00	1,560.27	1.588	0.048	0.073	0.000
39	21,648.91	0.50	725.46	53.83	180.05	151.00	0.00	521.58	1.391	0.299	0.208	0.000
40	106,587.48	2.45	1,963.38	126.27	824.92	126.27	0.00	1,157.33	1.696	0.153	0.064	0.000
41	23,513.93	0.54	688.80	47.92	222.74	185.94	0.00	543.58	1.267	0.215	0.270	0.000
42	81,931.46	1.88	1,260.44	212.78	462.51	242.76	0.00	1,014.68	1.242	0.460	0.193	0.000
43	172,066.33	3.95	2,341.36	113.04	746.42	125.49	0.00	1,470.46	1.592	0.151	0.054	0.000
44	168,333.18	3.86	2,054.59	138.37	803.71	156.47	0.00	1,454.42	1.413	0.172	0.076	0.000
45	31,178.47	0.72	799.84	100.26	286.54	100.26	0.00	625.94	1.278	0.350	0.125	0.000
46	92,864.90	2.13	1,737.48	125.43	746.42	125.43	0.00	1,080.27	1.608	0.168	0.072	0.000
47	117,301.78	2.69	1,791.99	89.72	733.91	179.73	0.00	1,214.11	1.476	0.122	0.100	0.000
48	193,098.73	4.43	2,383.93	59.43	559.84	244.12	0.00	1,557.74	1.530	0.106	0.102	0.000
49	144,460.54	3.32	1,905.98	66.27	668.00	232.76	0.00	1,347.35	1.415	0.099	0.122	0.000
50	79,776.51	1.83	1,151.17	221.01	350.00	254.00	0.00	1,001.25	1.150	0.631	0.221	0.000
51	42,371.57	0.97	1,222.14	66.27	532.45	96.34	0.00	729.70	1.675	0.124	0.079	0.000
52	35,097.48	0.81	1,192.51	50.82	532.45	84.71	0.00	664.11	1.796	0.095	0.071	0.000
53	96,664.99	2.22	1,408.44	143.71	524.53	235.72	0.00	1,102.15	1.278	0.274	0.167	0.000
54	96,988.03	2.23	1,392.80	165.31	502.17	220.79	0.00	1,103.99	1.262	0.329	0.159	0.000
55	57,313.74	1.32	1,394.92	65.21	502.17	243.31	0.00	848.66	1.644	0.130	0.174	0.000
56	48,526.84	1.11	887.18	106.35	276.10	437.74	0.00	780.90	1.136	0.385	0.493	0.000

Table A.2 (continued)

Parcel ID	Building Name	Address	Building Use	Footprint Area (Sq. Ft.)	Total Floor Area (Sq. Ft.)	Floor Area Ratio	Year Built	Number of Floors
				S(f)	S(t)	FAR		
1	3695 Buckhead Loop	3695 Buckhead Loop	Residence	830	830	0.022		1
2	3592 Stratford Rd	3592 Stratford Rd	Residence	2,000	2,000	0.081		1
3	3585 Buckhead Loop	3585 Buckhead Loop	Residence	1,800	2,500	0.079		2
4	3580 Stratford Rd	3580 Stratford Rd	Residence	1,300	2,200	0.086		2
5	3575 Buckhead Loop	3575 Buckhead Loop	Residence	1,650	2,500	0.063		2
6	3570 Stratford Rd	3570 Stratford Rd	Residence	1,100	2,000	0.151		2
7	No Building	3464 Peachtree Rd	N/A	0	0	0.000		0
8	3561 Buckhead Loop	3561 Buckhead Loop	Residence	1,650	2,500	0.046		2
9	3460 Stratford Rd	3460 Stratford Rd	Residence	2,000	2,000	0.043		1
10	No Building		N/A	0	0	0.000		0
11	3555 Buckhead Loop	3555 Buckhead Loop	Residence	1,850	1,850	0.056		1
12	3539 Buckhead Loop	3539 Buckhead Loop	Residence	1,900	2,500	0.047		2
13	3450 Stratford Rd	3450 Stratford Rd	Residence	1,600	1,600	0.033		1
14	No Building	3529 Buckhead Loop	N/A	0	0	0.000		0
15	3442 Stratford Rd	3442 Stratford Rd	Residence	2,400	2,400	0.070		1
16	3525 Buckhead Loop	3525 Buckhead Loop	Residence	2,000	2,000	0.018		1
17	No Building	3521 Buckhead Loop	N/A	0	0	0.000		0
18	3438 Stratford Rd	3438 Stratford Rd	Residence	2,200	2,200	0.057		1
19	3507 Buckhead Loop	3507 Buckhead Loop	Residence	3,850	3,850	0.018		1
20	3428 Stratford Rd	3428 Stratford Rd	Residence	2,150	2,150	0.047		1
21	3420 Stratford Rd	3420 Stratford Rd	Residence	2,200	2,200	0.043		1
22	3414 Stratford Rd	3414 Stratford Rd	Residence	2,800	2,800	0.067		1
23	3487 Buckhead Loop	3487 Buckhead Loop	Residence	1,800	1,800	0.020		1
24	No Building	3410 Stratford Rd	N/A	0	0	0.000		0
25	No Building	3477 Buckhead Loop	N/A	0	0	0.000		0
26	3390-3400 Stratford Rd	3390-3400 Stratford Rd	Residence	3,600	3,600	0.108		1
27	3368 Peachtree Rd	3368 Peachtree Rd	Residence	2,100	3,300	0.032		2
28	3471 Buckhead Loop	3471 Buckhead Loop	Residence	1,500	1,500	0.022		1

Table A.2 (continued)

Parcel ID	Building Name	Address	Building Use	Footprint Area (Sq. Ft.)	Total Floor Area (Sq. Ft.)	Floor Area Ratio	Year Built	Number of Floors
				S(f)	S(t)	FAR		
29	3390-3400 Stratford Rd	3390-3400 Stratford Rd	Residence	0	0	0.000		1
30	3350 Peachtree Rd	3350 Peachtree Rd	Residence	1,950	3,000	0.031		2
31	3467 Buckhead Loop	3467 Buckhead Loop	Residence	1,500	1,500	0.083		1
32	Second Church of Christ Scientist	3372 Peachtree Rd	Church	6,800	8,600	0.078		2
33	3350 Peachtree Rd	3350 Peachtree Rd	Residence	2,800	4,800	0.017		2
34	3459 Buckhead Loop	3459 Buckhead Loop	Residence	2,000	2,000	0.107		1
35	3336 Peachtree Rd	3336 Peachtree Rd	Residence	1,600	1,600	0.012		1
36	3455 Buckhead Loop	3455 Buckhead Loop	Residence	2,000	2,000	0.107		1
37	3445 Buckhead Loop	3445 Buckhead Loop	Residence	2,400	2,400	0.129		1
38	Cotton Producers Association	3348 Peachtree Rd	Office	22,600	86,000	0.444	1966	4
39	3435 Buckhead Loop	3435 Buckhead Loop	Residence	2,000	2,000	0.092		1
40	3399 Piedmont Rd	3399 Piedmont Rd	Residence	4,150	4,150	0.039		1
41	3423 Piedmont Rd	3423 Piedmont Rd	Residence	2,350	2,350	0.100		1
42	3405 Piedmont Rd	3405 Piedmont Rd	Residence	6,000	6,000	0.073		1
43	3381 Piedmont Rd	3381 Piedmont Rd	Residence	3,900	5,500	0.032		2
44	3340 Peachtree Rd	3340 Peachtree Rd	Residence	3,400	3,800	0.023		2
45	No Building	3351 Piedmont Rd	N/A	0	0	0.000		0
46	3361 Piedmont Rd	3361 Piedmont Rd	Residence	3,900	5,900	0.064		2
47	Office	3330 Peachtree Rd	Office	14,500	60,000	0.512	1960	5
48	R.L. Hope School	3315 Piedmont Rd	School	27,000	54,000	0.280	1925	2
49	Auto Sales and Services / Iron Body Shop	3316 -3322 Peachtree Rd	Auto	50,000	50,000	0.346	1966	1
50	3349-3355 Piedmont Rd	3349-3355 Piedmont Rd	Residence	4,500	6,500	0.081		2
51	No Building	3300 Peachtree Rd	N/A	0	0	0.000		0
52	3278 Peachtree	3278 Peachtree Rd	Residence	2,600	2,600	0.074		1
53	Bank	3270-3272 Peachtree Rd	Office	21,000	76,000	0.786	1958	4
54	Auto Sales and Services	3266 Peachtree Rd	Auto	26,000	26,000	0.268	1959	1
55	Auto Sales and Services	3260 Peachtree Rd	Auto	63,000	63,000	1.099	1957	1
56	Auto Sales and Services	3260 Peachtree Rd	Auto	0	0	0.000	1957	1

Table A.3 Parcel and Building Data in the Tower Place Block, 1979

Parcel ID	Area (Sq. Ft.)	Area (Acre)	Perimeter (Ft.)	Shortest Side (Ft.)	Longest Side (Ft.)	Street Frontage (Ft.)	Internal Road Frontage (Ft.)	Perimeter of Circle with the same area A(p)	Compact-ness	Ratio of Shortest Side/Longest Side	Street Frontage Ratio	Internal Road Frontage Ratio
	S(p1)	S(p2)	P(p)	L(s)	L(l)	L(f)	L(i)	P(m)	P(p)/P(m)	L(s)/L(l)	L(f)/P(p)	L(i)/P(p)
1	38,465.16	0.88	843.46	143.40	293.92	398.23	0.00	695.25	1.213	0.488	0.472	0.000
2	24,717.71	0.57	738.82	82.02	276.44	124.93	0.00	557.33	1.326	0.297	0.169	0.000
3	31,675.30	0.73	837.38	104.92	313.41	104.92	0.00	630.91	1.327	0.335	0.125	0.000
4	25,529.15	0.59	794.42	32.90	305.91	101.91	0.00	566.40	1.403	0.108	0.128	0.000
5	39,609.67	0.91	1,023.26	102.61	408.08	102.61	0.00	705.51	1.450	0.251	0.100	0.000
6	13,221.26	0.30	477.37	103.35	162.48	103.35	0.00	407.61	1.171	0.636	0.216	0.000
7	24,619.06	0.57	754.94	131.69	319.87	319.87	0.00	556.21	1.357	0.412	0.424	0.000
8	53,823.57	1.24	1,107.24	127.02	433.93	127.02	0.00	822.41	1.346	0.293	0.115	0.000
9	46,832.82	1.08	1,027.14	95.72	404.75	95.72	0.00	767.15	1.339	0.236	0.093	0.000
10	104,541.85	2.40	2,180.04	5.32	365.20	0.00	0.00	1,146.17	1.902	0.015	0.000	0.000
11	32,883.74	0.75	1,086.46	75.52	487.52	75.52	0.00	642.83	1.690	0.155	0.070	0.000
12	53,453.54	1.23	1,246.75	102.88	567.50	102.88	0.00	819.58	1.521	0.181	0.083	0.000
13	48,959.05	1.12	1,077.27	96.85	437.64	96.85	0.00	784.37	1.373	0.221	0.090	0.000
14	64,286.25	1.48	1,463.36	106.05	660.56	106.05	0.00	898.80	1.628	0.161	0.072	0.000
15	34,155.04	0.78	817.90	100.00	302.82	100.00	0.00	655.14	1.248	0.330	0.122	0.000
16	111,270.18	2.55	1,948.49	106.94	660.56	106.94	0.00	1,182.48	1.648	0.162	0.055	0.000
17	45,953.20	1.05	1,051.90	109.35	414.94	122.27	0.00	759.91	1.384	0.264	0.116	0.000
18	38,653.07	0.89	884.15	100.00	332.18	100.00	0.00	696.94	1.269	0.301	0.113	0.000
19	215,078.12	4.94	2,242.40	95.17	845.28	296.87	0.00	1,644.00	1.364	0.113	0.132	0.000
20	45,288.77	1.04	1,017.06	102.84	398.04	102.84	0.00	754.40	1.348	0.258	0.101	0.000
21	51,082.49	1.17	1,072.90	93.41	424.18	93.41	0.00	801.20	1.339	0.220	0.087	0.000
22	41,777.08	0.96	1,040.62	42.14	424.18	100.00	0.00	724.56	1.436	0.099	0.096	0.000
23	89,420.88	2.05	1,947.78	98.21	793.50	98.21	0.00	1,060.04	1.837	0.124	0.050	0.000
24	20,068.68	0.46	919.76	50.00	415.98	50.00	0.00	502.19	1.832	0.120	0.054	0.000
25	72,857.23	1.67	1,759.67	94.27	793.50	94.27	0.00	956.84	1.839	0.119	0.054	0.000
26	33,280.53	0.76	946.69	56.09	401.98	95.83	0.00	646.70	1.464	0.140	0.101	0.000
27	102,343.63	2.35	2,057.81	99.90	921.45	123.92	0.00	1,134.06	1.815	0.108	0.060	0.000

Table A.3 (continued)

Parcel ID	Area (Sq. Ft.)	Area (Acre)	Perimeter (Ft.)	Shortest Side (Ft.)	Longest Side (Ft.)	Street Frontage (Ft.)	Internal Road Frontage (Ft.)	Perimeter of Circle with the same area A(p)	Compact-ness	Ratio of Shortest Side/Longest Side	Street Frontage Ratio	Internal Road Frontage Ratio
	S(p1)	S(p2)	P(p)	L(s)	L(l)	L(f)	L(i)	P(m)	P(p)/P(m)	L(s)/L(l)	L(f)/P(p)	L(i)/P(p)
28	69,649.01	1.60	1,712.89	96.21	771.89	96.21	0.00	935.54	1.831	0.125	0.056	0.000
29	31,798.59	0.73	946.60	82.00	344.40	82.00	0.00	632.13	1.497	0.238	0.087	0.000
30	95,645.89	2.20	2,055.81	103.59	926.81	103.59	0.00	1,096.32	1.875	0.112	0.050	0.000
31	18,146.30	0.42	644.05	70.28	193.64	70.28	0.00	477.53	1.349	0.363	0.109	0.000
32	109,667.85	2.52	1,378.68	200.13	469.31	564.97	0.00	1,173.94	1.174	0.426	0.410	0.000
33	285,700.80	6.56	2,529.32	301.96	999.44	301.96	0.00	1,894.79	1.335	0.302	0.119	0.000
34	18,622.49	0.43	647.05	75.22	197.31	75.22	0.00	483.75	1.338	0.381	0.116	0.000
35	336,324.87	7.72	2,995.66	34.26	501.18	0.00	452.38	2,055.82	1.457	0.068	0.000	0.151
36	18,610.02	0.43	646.73	75.23	201.10	75.23	0.00	483.59	1.337	0.374	0.116	0.000
37	18,550.20	0.43	646.26	75.00	205.08	75.00	0.00	482.81	1.339	0.366	0.116	0.000
38	193,728.03	4.45	2,478.10	48.26	999.44	179.90	0.00	1,560.27	1.588	0.048	0.073	0.000
39	21,648.91	0.50	725.46	53.83	180.05	151.00	0.00	521.58	1.391	0.299	0.208	0.000
40	23,513.93	0.54	688.80	15.66	222.74	185.94	0.00	543.58	1.267	0.070	0.270	0.000
41	83,359.81	1.91	1,274.95	212.78	462.51	242.76	0.00	1,023.49	1.246	0.460	0.190	0.000
42	116,851.76	2.68	1,923.88	5.01	803.71	103.51	921.36	1,211.78	1.588	0.006	0.054	0.479
43	119,791.90	2.75	3,597.19	5.01	678.64	197.24	0.00	1,226.93	2.932	0.007	0.055	0.000
44	224,266.91	5.15	2,139.60	36.43	590.08	533.94	590.20	1,678.76	1.275	0.062	0.250	0.276
45	114,417.27	2.63	1,685.35	24.73	666.07	124.11	825.72	1,199.09	1.406	0.037	0.074	0.490
46	137,140.45	3.15	2,069.11	136.30	559.84	227.44	329.80	1,312.77	1.576	0.243	0.110	0.159
47	144,460.54	3.32	1,905.98	66.27	668.00	232.76	0.00	1,347.35	1.415	0.099	0.122	0.000
48	41,225.67	0.95	934.94	115.50	348.84	124.95	348.84	719.76	1.299	0.331	0.134	0.373
49	42,371.57	0.97	1,222.14	66.27	532.45	96.34	0.00	729.70	1.675	0.124	0.079	0.000
50	35,097.48	0.81	1,192.51	50.82	532.45	84.71	0.00	664.11	1.796	0.095	0.071	0.000
51	96,664.99	2.22	1,408.44	143.71	524.53	235.72	0.00	1,102.15	1.278	0.274	0.167	0.000
52	96,988.03	2.23	1,392.80	165.31	502.17	220.79	0.00	1,103.99	1.262	0.329	0.159	0.000
53	57,313.74	1.32	1,394.92	65.21	502.17	243.31	0.00	848.66	1.644	0.130	0.174	0.000
54	48,526.84	1.11	887.18	92.14	276.10	437.74	0.00	780.90	1.136	0.334	0.493	0.000

Table A.3 (continued)

Parcel ID	Building Name	Address	Building Use	Footprint Area (Sq. Ft.)	Total Floor Area (Sq. Ft.)	Floor Area Ratio	Year Built	Number of Floors
				S(f)	S(t)	FAR		
1	3695 Buckhead Loop	3695 Buckhead Loop	Residence	830	830	0.022		1
2	3592 Stratford Rd	3592 Stratford Rd	Residence	2,000	2,000	0.081		1
3	3585 Buckhead Loop	3585 Buckhead Loop	Residence	1,800	2,500	0.079		2
4	3580 Stratford Rd	3580 Stratford Rd	Residence	1,300	2,200	0.086		2
5	3575 Buckhead Loop	3575 Buckhead Loop	Residence	1,650	2,500	0.063		2
6	3570 Stratford Rd	3570 Stratford Rd	Residence	1,100	2,000	0.151		2
7	No Building	3464 Peachtree Rd	N/A	0	0	0.000		0
8	3561 Buckhead Loop	3561 Buckhead Loop	Residence	1,650	2,500	0.046		2
9	3460 Stratford Rd	3460 Stratford Rd	Residence	2,000	2,000	0.043		1
10	No Building		N/A	0	0	0.000		0
11	3555 Buckhead Loop	3555 Buckhead Loop	Residence	1,850	1,850	0.056		1
12	3539 Buckhead Loop	3539 Buckhead Loop	Residence	1,900	2,500	0.047		2
13	3450 Stratford Rd	3450 Stratford Rd	Residence	1,600	1,600	0.033		1
14	No Building	3529 Buckhead Loop	N/A	0	0	0.000		0
15	3442 Stratford Rd	3442 Stratford Rd	Residence	2,400	2,400	0.070		1
16	3525 Buckhead Loop	3525 Buckhead Loop	Residence	2,000	2,000	0.018		1
17	No Building	3521 Buckhead Loop	N/A	0	0	0.000		0
18	3438 Stratford Rd	3438 Stratford Rd	Residence	2,200	2,200	0.057		1
19	3507 Buckhead Loop	3507 Buckhead Loop	Residence	3,850	3,850	0.018		1
20	3428 Stratford Rd	3428 Stratford Rd	Residence	2,150	2,150	0.047		1
21	3420 Stratford Rd	3420 Stratford Rd	Residence	2,200	2,200	0.043		1
22	3414 Stratford Rd	3414 Stratford Rd	Residence	2,800	2,800	0.067		1
23	3487 Buckhead Loop	3487 Buckhead Loop	Residence	1,800	1,800	0.020		1
24	No Building	3410 Stratford Rd	N/A	0	0	0.000		0
25	No Building	3477 Buckhead Loop	N/A	0	0	0.000		0
26	3390-3400 Stratford Rd	3390-3400 Stratford Rd	Residence	3,600	3,600	0.108		1
27	3368 Peachtree Rd	3368 Peachtree Rd	Residence	2,100	3,300	0.032		2

Table A.3 (continued)

Parcel ID	Building Name	Address	Building Use	Footprint Area (Sq. Ft.)	Total Floor Area (Sq. Ft.)	Floor Area Ratio	Year Built	Number of Floors
				S(f)	S(t)	FAR		
28	3471 Buckhead Loop	3471 Buckhead Loop	Residence	1,500	1,500	0.022		1
29	3390-3400 Stratford Rd	3390-3400 Stratford Rd	Residence	0	0	0.000		1
30	3350 Peachtree Rd	3350 Peachtree Rd	Residence	1,950	3,000	0.031		2
31	3467 Buckhead Loop	3467 Buckhead Loop	Residence	1,500	1,500	0.083		1
32	Second Church of Christ Scientist	3372 Peachtree Rd	Church	6,800	8,600	0.078		2
33	3350 Peachtree Rd	3350 Peachtree Rd	Residence	2,800	4,800	0.017		2
34	3459 Buckhead Loop	3459 Buckhead Loop	Residence	2,000	2,000	0.107		1
35	Tower Place 100	3340 Peachtree Rd	Office	143,000	981,702	2.919	1974	29
36	3455 Buckhead Loop	3455 Buckhead Loop	Residence	2,000	2,000	0.107		1
37	3445 Buckhead Loop	3445 Buckhead Loop	Residence	2,400	2,400	0.129		1
38	Cotton Producers Association	3348 Peachtree Rd	Office	22,600	86,000	0.444	1966	4
39	3435 Buckhead Loop	3435 Buckhead Loop	Residence	2,000	2,000	0.092		1
40	3423 Piedmont Rd	3423 Piedmont Rd	Residence	2,350	2,350	0.100		1
41	3405 Piedmont Rd	3405 Piedmont Rd	Residence	5,800	5,800	0.070		1
42	DoubleTree Hotel - Atlanta Buckhead	3342 Peachtree Rd	Hotel	33,000	90,000	0.770	1975	6
43	Tower Place Drive		N/A	0	0	0.000	1975	0
44	Tower Walk	3365 Piedmont Rd	Retail	154,000	300,000	1.338	1974	2
45	Office	3330 Peachtree Rd	Office	46,500	120,000	1.049	1960	5
46	R.L. Hope School	3315 Piedmont Rd	School	27,000	54,000	0.394	1925	2
47	Auto Sales and Services / Iron Body Shop	3316 -3322 Peachtree Rd	Auto	50,000	50,000	0.346	1966	1
48	Piedmont Plaza	3349 Piedmont Rd	Retail	12,800	23,000	0.558	1975	2
49	No building	3300 Peachtree Rd	N/A	0	0	0.000		0
50	Residence, 3278 Peachtree Rd	3278 Pechtree Rd	Residence	2,600	2,600	0.074		1
51	Bank	3270-3272 Peachtree Rd	Office	21,000	76,000	0.786	1958	4
52	Auto Sales and Services	3266 Peachtree Rd	Auto	26,000	26,000	0.268	1959	1
53	Auto Sales and Services	3260 Peachtree Rd	Auto	63,000	63,000	1.099	1957	1
54	Auto Sales and Services	3260 Peachtree Rd	Auto	0	0	0.000	1957	1

Table A.4 Parcel and Building Data in the Tower Place Block, 1988

Parcel ID	Area (Sq. Ft.)	Area (Acre)	Perimeter (Ft.)	Shortest Side (Ft.)	Longest Side (Ft.)	Street Frontage (Ft.)	Internal Road Frontage (Ft.)	Perimeter of Circle with the same area A(p)	Compact-ness	Ratio of Shortest Side/Longest Side	Street Frontage Ratio	Internal Road Frontage Ratio
	S(p1)	S(p2)	P(p)	L(s)	L(l)	L(f)	L(i)	P(m)	P(p)/P(m)	L(s)/L(l)	L(f)/P(p)	L(i)/P(p)
1	38,465.16	0.88	843.46	143.40	293.92	398.23	0.00	695.25	1.213	0.488	0.472	0.000
2	24,717.71	0.57	738.82	82.02	276.44	124.93	0.00	557.33	1.326	0.297	0.169	0.000
3	31,675.30	0.73	837.38	104.92	313.41	104.92	0.00	630.91	1.327	0.335	0.125	0.000
4	25,529.15	0.59	794.42	32.90	305.91	101.91	0.00	566.40	1.403	0.108	0.128	0.000
5	39,609.67	0.91	1,023.26	102.61	408.08	102.61	0.00	705.51	1.450	0.251	0.100	0.000
6	13,221.26	0.30	477.37	103.35	162.48	103.35	0.00	407.61	1.171	0.636	0.216	0.000
7	24,619.06	0.57	754.94	131.69	319.87	319.87	0.00	556.21	1.357	0.412	0.424	0.000
8	53,823.57	1.24	1,107.24	127.02	433.93	127.02	0.00	822.41	1.346	0.293	0.115	0.000
9	46,832.82	1.08	1,027.14	95.72	404.75	95.72	0.00	767.15	1.339	0.236	0.093	0.000
10	104,541.85	2.40	2,180.04	5.32	365.20	0.00	0.00	1,146.17	1.902	0.015	0.000	0.000
11	32,883.74	0.75	1,086.46	75.52	487.52	75.52	0.00	642.83	1.690	0.155	0.070	0.000
12	53,453.54	1.23	1,246.75	102.88	567.50	102.88	0.00	819.58	1.521	0.181	0.083	0.000
13	48,959.05	1.12	1,077.27	96.85	437.64	96.85	0.00	784.37	1.373	0.221	0.090	0.000
14	64,286.25	1.48	1,463.36	106.05	660.56	106.05	0.00	898.80	1.628	0.161	0.072	0.000
15	34,155.04	0.78	817.90	100.00	302.82	100.00	0.00	655.14	1.248	0.330	0.122	0.000
16	111,270.18	2.55	1,948.49	106.94	660.56	106.94	0.00	1,182.48	1.648	0.162	0.055	0.000
17	45,953.20	1.05	1,051.90	109.35	414.94	122.27	0.00	759.91	1.384	0.264	0.116	0.000
18	38,653.07	0.89	884.15	100.00	332.18	100.00	0.00	696.94	1.269	0.301	0.113	0.000
19	215,078.12	4.94	2,242.40	95.17	845.28	296.87	0.00	1,644.00	1.364	0.113	0.132	0.000
20	45,288.77	1.04	1,017.06	102.84	398.04	102.84	0.00	754.40	1.348	0.258	0.101	0.000
21	51,082.49	1.17	1,072.90	93.41	424.18	93.41	0.00	801.20	1.339	0.220	0.087	0.000
22	41,777.08	0.96	1,040.62	42.14	424.18	100.00	0.00	724.56	1.436	0.099	0.096	0.000
23	89,420.89	2.05	1,947.78	98.21	793.50	98.21	0.00	1,060.04	1.837	0.124	0.050	0.000
24	20,068.68	0.46	919.76	50.00	415.98	50.00	0.00	502.19	1.832	0.120	0.054	0.000
25	72,857.23	1.67	1,759.67	94.27	793.50	94.27	0.00	956.84	1.839	0.119	0.054	0.000
26	33,280.53	0.76	946.69	56.09	401.98	95.83	0.00	646.70	1.464	0.140	0.101	0.000
27	102,343.63	2.35	2,057.81	99.90	921.45	123.92	0.00	1,134.06	1.815	0.108	0.060	0.000

Table A.4 (continued)

Parcel ID	Area (Sq. Ft.)	Area (Acre)	Perimeter (Ft.)	Shortest Side (Ft.)	Longest Side (Ft.)	Street Frontage (Ft.)	Internal Road Frontage (Ft.)	Perimeter of Circle with the same area A(p)	Compact-ness	Ratio of Shortest Side/Longest Side	Street Frontage Ratio	Internal Road Frontage Ratio
	S(p1)	S(p2)	P(p)	L(s)	L(l)	L(f)	L(i)	P(m)	P(p)/P(m)	L(s)/L(l)	L(f)/P(p)	L(i)/P(p)
28	69,649.01	1.60	1,712.89	96.21	771.89	96.21	0.00	935.54	1.831	0.125	0.056	0.000
29	31,798.59	0.73	946.60	82.00	344.40	82.00	0.00	632.13	1.497	0.238	0.087	0.000
30	95,645.89	2.20	2,055.81	103.59	926.81	103.59	0.00	1,096.32	1.875	0.112	0.050	0.000
31	18,146.30	0.42	644.05	70.28	193.64	70.28	0.00	477.53	1.349	0.363	0.109	0.000
32	80,632.84	1.85	1,547.10	19.09	469.31	275.13	0.00	1,006.61	1.537	0.041	0.178	0.000
33	285,700.80	6.56	2,529.32	301.96	999.44	301.96	0.00	1,894.79	1.335	0.302	0.119	0.000
34	18,622.49	0.43	647.05	75.22	197.31	75.22	0.00	483.75	1.338	0.381	0.116	0.000
35	336,324.87	7.72	2,995.66	34.26	501.18	0.00	452.38	2,055.82	1.457	0.068	0.000	0.151
36	18,610.02	0.43	646.73	75.23	201.10	75.23	0.00	483.59	1.337	0.374	0.116	0.000
37	63,713.04	1.46	1,004.05	15.66	258.24	434.99	0.00	894.79	1.122	0.061	0.433	0.000
38	193,728.03	4.45	2,478.10	48.26	999.44	179.90	0.00	1,560.27	1.588	0.048	0.073	0.000
39	29,035.01	0.67	748.11	19.09	187.61	289.85	0.00	604.04	1.239	0.102	0.387	0.000
40	83,359.81	1.91	1,274.95	212.78	462.51	242.76	0.00	1,023.49	1.246	0.460	0.190	0.000
41	116,851.76	2.68	1,923.88	5.01	803.71	103.51	921.36	1,211.78	1.588	0.006	0.054	0.479
42	119,791.90	2.75	3,597.19	5.01	678.64	197.24	0.00	1,226.93	2.932	0.007	0.055	0.000
43	224,266.91	5.15	2,139.60	36.43	590.08	533.94	590.20	1,678.76	1.275	0.062	0.250	0.276
44	114,417.27	2.63	1,685.35	24.73	666.07	124.11	825.72	1,199.09	1.406	0.037	0.074	0.490
45	137,140.45	3.15	2,069.11	136.30	559.84	227.44	329.80	1,312.77	1.576	0.243	0.110	0.159
46	144,460.54	3.32	1,905.98	66.27	668.00	232.76	0.00	1,347.35	1.415	0.099	0.122	0.000
47	41,225.67	0.95	934.94	115.50	348.84	124.95	348.84	719.76	1.299	0.331	0.134	0.373
48	42,371.57	0.97	1,222.14	66.27	532.45	96.34	0.00	729.70	1.675	0.124	0.079	0.000
49	35,097.48	0.81	1,192.51	50.82	532.45	84.71	0.00	664.11	1.796	0.095	0.071	0.000
50	96,664.99	2.22	1,408.44	143.71	524.53	235.72	0.00	1,102.15	1.278	0.274	0.167	0.000
51	96,988.03	2.23	1,392.80	165.31	502.17	220.79	0.00	1,103.99	1.262	0.329	0.159	0.000
52	57,313.74	1.32	1,394.92	65.21	502.17	243.31	0.00	848.66	1.644	0.130	0.174	0.000
53	48,526.84	1.11	887.18	92.14	276.10	437.74	0.00	780.90	1.136	0.334	0.493	0.000

Table A.4 (continued)

Parcel ID	Building Name	Address	Building Use	Footprint Area (Sq. Ft.)	Total Floor Area (Sq. Ft.)	Floor Area Ratio	Year Built	Number of Floors
				S(f)	S(t)	FAR		
1	3695 Buckhead Loop	3695 Buckhead Loop	Residence	830	830	0.022		1
2	3592 Stratford Rd	3592 Stratford Rd	Residence	2,000	2,000	0.081		1
3	3585 Buckhead Loop	3585 Buckhead Loop	Residence	1,800	2,500	0.079		2
4	3580 Stratford Rd	3580 Stratford Rd	Residence	1,300	2,200	0.086		2
5	3575 Buckhead Loop	3575 Buckhead Loop	Residence	1,650	2,500	0.063		2
6	3570 Stratford Rd	3570 Stratford Rd	Residence	1,100	2,000	0.151		2
7	No Building	3464 Peachtree Rd	N/A	0	0	0.000		0
8	3561 Buckhead Loop	3561 Buckhead Loop	Residence	1,650	2,500	0.046		2
9	3460 Stratford Rd	3460 Stratford Rd	Residence	2,000	2,000	0.043		1
10	No Building		N/A	0	0	0.000		0
11	3555 Buckhead Loop	3555 Buckhead Loop	Residence	1,850	1,850	0.056		1
12	3539 Buckhead Loop	3539 Buckhead Loop	Residence	1,900	2,500	0.047		2
13	3450 Stratford Rd	3450 Stratford Rd	Residence	1,600	1,600	0.033		1
14	No building	3529 Buckhead Loop	N/A	0	0	0.000		0
15	3442 Stratford Rd	3442 Stratford Rd	Residence	2,400	2,400	0.070		1
16	3525 Buckhead Loop	3525 Buckhead Loop	Residence	2,000	2,000	0.018		1
17	No Building	3521 Buckhead Loop	N/A	0	0	0.000		0
18	3438 Stratford Rd	3438 Stratford Rd	Residence	2,200	2,200	0.057		1
19	3507 Buckhead Loop	3507 Buckhead Loop	Residence	3,850	3,850	0.018		1
20	3428 Stratford Rd	3428 Stratford Rd	Residence	2,150	2,150	0.047		1
21	3420 Stratford Rd	3420 Stratford Rd	Residence	2,200	2,200	0.043		1
22	Residence, 3414 Stratford Rd	3414 Stratford Rd	Residence	2,800	2,800	0.067		1
23	Residence, 3487 Buckhead Loop	3487 Buckhead Loop	Residence	1,800	1,800	0.020		1
24	No building	3410 Stratford Rd	N/A	0	0	0.000		0
25	No building	3477 Buckhead Loop	N/A	0	0	0.000		0
26	3390-3400 Stratford Rd	3390-3400 Stratford Rd	Residence	3,600	3,600	0.108		1
27	3368 Peachtree Rd	3368 Peachtree Rd	Residence	2,100	3,300	0.032		2

Table A.4 (continued)

Parcel ID	Building Name	Address	Building Use	Footprint Area (Sq. Ft.)	Total Floor Area (Sq. Ft.)	Floor Area Ratio	Year Built	Number of Floors
				S(f)	S(t)	FAR		
28	3471 Buckhead Loop	3471 Buckhead Loop	Residence	1,500	1,500	0.022		1
29	3390-3400 Stratford Rd	3390-3400 Stratford Rd	Residence	0	0	0.000		1
30	3350 Peachtree Rd	3350 Peachtree Rd	Residence	1,950	3,000	0.031		2
31	3467 Buckhead Loop	3467 Buckhead Loop	Residence	1,500	1,500	0.083		1
32	No Building	3380 Stratford Rd	N/A	0	0	0.000		0
33	One Capitol City Plaza	3350 Peachtree Rd	Office	53,000	410,128	1.436	1989	17
34	3459 Buckhead Loop	3459 Buckhead Loop	Residence	2,000	2,000	0.107		1
35	Tower Place 100	3340 Peachtree Rd	Office	143,000	981,702	2.919	1974	29
36	3455 Buckhead Loop	3455 Buckhead Loop	Residence	2,000	2,000	0.107		1
37	Ivy Place	3423 Piedmont Rd	Office	40,000	183,751	2.884	1985	6
38	Cotton Producers Association	3348 Peachtree Rd	Office	22,600	86,000	0.444	1966	4
39	Second Church of Christ Scientist	3372 Peachtree Rd	Church	6,800	8,600	0.296		2
40	3405 Piedmont	3405 Piedmont Rd	Office	54,300	180,581	2.166	1985	5
41	DoubleTree Hotel - Atlanta Buckhead	3342 Peachtree Rd	Hotel	33,000	90,000	0.770	1975	6
42	Tower Place Drive		N/A	0	0	0.000		0
43	Tower Walk	3365 Piedmont Rd	Retail	154,000	300,000	1.338	1974	2
44	American InterContinental University	3330 Peachtree Rd	Office	14,490	60,798	0.531	1975	5
45	No Building	3317 Piedmont Rd	N/A	0	0	0.000		0
46	Auto Sales and Services / Iron Body Shop	3316 -3322 Peachtree Rd	Auto	50,000	50,000	0.346	1966	1
47	Piedmont Plaza	3349 Piedmont Rd	Retail	12,800	23,000	0.558	1975	2
48	Building under Construction	3300 Peachtree Rd	N/A	0	0	0.000		0
49	Building under Construction	3300 Peachtree Rd	N/A	0	0	0.000		0
50	Building under Construction	3300 Peachtree Rd	N/A	0	0	0.000		0
51	Building under Construction	3300 Peachtree Rd	N/A	0	0	0.000		0
52	Building under Construction	3304 Peachtree Rd	N/A	0	0	0.000		0
53	Building under Construction	3300 Peachtree Rd	N/A	0	0	0.000		0

Table A.5 Parcel and Building Data in the Tower Place Block, 1993

Parcel ID	Area (Sq. Ft.)	Area (Acre)	Perimeter (Ft.)	Shortest Side (Ft.)	Longest Side (Ft.)	Street Frontage (Ft.)	Internal Road Frontage (Ft.)	Perimeter of Circle with the same area A(p)	Compact-ness	Ratio of Shortest Side/Longest Side	Street Frontage Ratio	Internal Road Frontage Ratio
	S(p1)	S(p2)	P(p)	L(s)	L(l)	L(f)	L(i)	P(m)	P(p)/P(m)	L(s)/L(l)	L(f)/P(p)	L(i)/P(p)
1	124,067.63	2.85	1,869.67	106.10	430.33	206.72	0.00	1,248.63	1.497	0.247	0.111	0.000
2	40,988.02	0.94	972.88	106.10	383.42	127.04	0.00	717.68	1.356	0.277	0.131	0.000
3	211,076.51	4.85	2,218.70	95.17	813.75	304.48	0.00	1,628.64	1.362	0.117	0.137	0.000
4	89,420.89	2.05	1,947.78	95.17	793.50	98.21	0.00	1,060.04	1.837	0.120	0.050	0.000
5	72,857.23	1.67	1,759.67	94.27	793.50	94.27	0.00	956.84	1.839	0.119	0.054	0.000
6	69,649.01	1.60	1,712.89	96.21	771.89	96.21	0.00	935.54	1.831	0.125	0.056	0.000
7	257,419.02	5.91	2,429.07	112.58	977.11	112.58	0.00	1,798.56	1.351	0.115	0.046	0.000
8	18,146.30	0.42	644.05	70.28	249.16	70.28	0.00	477.53	1.349	0.282	0.109	0.000
9	18,622.49	0.43	647.05	75.22	248.41	75.22	0.00	483.75	1.338	0.303	0.116	0.000
10	336,324.87	7.72	2,995.66	36.43	501.18	0.00	452.38	2,055.82	1.457	0.073	0.000	0.151
11	18,610.02	0.43	646.73	75.23	248.19	75.23	0.00	483.59	1.337	0.303	0.116	0.000
12	63,713.04	1.46	1,004.05	15.66	258.24	434.99	0.00	894.79	1.122	0.061	0.433	0.000
13	193,728.03	4.45	2,478.10	48.26	999.44	179.90	0.00	1,560.27	1.588	0.048	0.073	0.000
14	83,359.81	1.91	1,274.95	212.78	462.51	242.76	0.00	1,023.49	1.246	0.460	0.190	0.000
15	116,851.76	2.68	1,923.88	5.01	803.71	103.51	921.36	1,211.78	1.588	0.006	0.054	0.479
16	119,791.52	2.75	3,599.02	5.01	678.64	197.24	0.00	1,226.92	2.933	0.007	0.055	0.000
17	224,266.91	5.15	2,139.60	36.43	590.08	533.94	590.20	1,678.76	1.275	0.062	0.250	0.276
18	115,224.01	2.65	1,661.64	30.13	666.07	124.11	825.72	1,203.31	1.381	0.045	0.075	0.497
19	364,391.88	8.37	3,178.77	329.39	693.18	681.75	682.72	2,139.88	1.485	0.475	0.214	0.215
20	182,826.97	4.20	2,288.70	25.02	559.84	844.13	0.00	1,515.74	1.510	0.045	0.369	0.000
21	122,334.37	2.81	1,620.07	25.02	199.43	226.19	0.00	1,239.88	1.307	0.125	0.140	0.000
22	29,429.74	0.68	823.05	63.05	285.73	151.94	0.00	608.13	1.353	0.221	0.185	0.000

Table A.5 (continued)

Parcel ID	Building Name	Address	Building Use	Footprint Area (Sq. Ft.)	Total Floor Area (Sq. Ft.)	Floor Area Ratio	Year Built	Number of Floors
				S(f)	S(t)	FAR		
1	No Building	3525 Buckhead Loop	N/A	0	0	0.000		0
2	No Building	3521 Buckhead Loop	N/A	0	0	0.000		0
3	3507 Buckhead Loop	3507 Buckhead Loop	Residence	3,850	3,850	0.018		1
4	3487 Buckhead Loop	3487 Buckhead Loop	Residence	1,800	1,800	0.020		1
5	No Building	3477 Buckhead Loop	N/A	0	0	0.000		0
6	3471 Buckhead Loop	3471 Buckhead Loop	Residence	1,500	1,500	0.022		1
7	One Capitol City Plaza	3350 Peachtree Rd	Office	53,000	410,128	1.593	1989	17
8	3467 Buckhead Loop	3467 Buckhead Loop	Residence	1,500	1,500	0.083		1
9	3455-3459 Buckhead Loop	3455-3459 Buckhead Loop	Office	8,200	8,200	0.440	1990	1
10	Tower Place 100	3340 Peachtree Rd	Office	153,000	981,702	2.919	1974	29
11	3455-3459 Buckhead Loop	3455-3459 Buckhead Loop	Office	0	0	0.000	1990	0
12	Ivy Place	3423 Piedmont Rd	Office	40,000	183,751	2.884	1985	6
13	Cotton Producers Association	3348 Peachtree Rd	Office	22,600	86,000	0.444	1966	4
14	3405 Piedmont	3405 Piedmont Rd	Office	54,300	180,581	2.166	1985	5
15	DoubleTree Hotel - Atlanta Buckhead	3342 Peachtree Rd	Hotel	33,000	90,000	0.770	1975	6
16	Tower Place Drive		N/A	0	0	0.000	1975	0
17	Tower Walk	3365 Piedmont Rd	Retail	154,000	300,000	1.338	1974	2
18	American InterContinental University	3330 Peachtree Rd	Office	14,490	60,798	0.528	1975	5
19	Piedmont Plaza	3349 Piedmont Rd	Retail	12,800	23,000	0.063	1975	2
20	Open Green Space		N/A	0	0	0.000		0
21	Grand Hyatt Atlanta	3300 Peachtree Rd	Hotel	65,000	430,000	3.515	1990	25
22	No Building	3314 Peachtree Rd	N/A	0	0	0.000		0

Table A.6 Parcel and Building Data in the Tower Place Block, 2000

Parcel ID	Area (Sq. Ft.)	Area (Acre)	Perimeter (Ft.)	Shortest Side (Ft.)	Longest Side (Ft.)	Street Frontage (Ft.)	Internal Road Frontage (Ft.)	Perimeter of Circle with the same area A(p)	Compact-ness	Ratio of Shortest Side/Longest Side	Street Frontage Ratio	Internal Road Frontage Ratio
	S(p1)	S(p2)	P(p)	L(s)	L(l)	L(f)	L(i)	P(m)	P(p)/P(m)	L(s)/L(l)	L(f)/P(p)	L(i)/P(p)
1	486,243.17	11.16	4,062.54	17.14	759.85	754.33	759.85	2,471.90	1.643	0.023	0.186	0.187
2	14,987.81	0.34	490.32	24.51	137.48	0.00	94.12	433.98	1.130	0.178	0.000	0.192
3	71,807.60	1.65	1,084.65	28.36	306.87	320.67	209.03	949.93	1.142	0.092	0.296	0.193
4	251,752.68	5.78	2,396.24	13.49	948.81	112.58	870.95	1,778.66	1.347	0.014	0.047	0.363
5	33,426.35	0.77	715.04	54.38	190.79	0.00	128.77	648.11	1.103	0.285	0.000	0.180
6	209,276.42	4.80	2,402.58	27.21	550.82	0.00	1,004.15	1,621.68	1.482	0.049	0.000	0.418
7	63,713.04	1.46	1,004.05	15.66	258.24	434.99	0.00	894.79	1.122	0.061	0.433	0.000
8	19,968.21	0.46	1,035.14	45.70	271.07	0.00	0.00	500.93	2.066	0.169	0.000	0.000
9	188,974.26	4.34	2,017.74	36.43	501.18	0.00	452.38	1,541.01	1.309	0.073	0.000	0.224
10	83,359.81	1.91	1,274.95	212.78	462.51	242.76	0.00	1,023.49	1.246	0.460	0.190	0.000
11	65,431.04	1.50	1,051.04	196.35	324.10	0.00	212.69	906.77	1.159	0.606	0.000	0.202
12	138,313.26	3.18	3,941.93	5.01	678.64	197.24	0.00	1,318.37	2.990	0.007	0.050	0.000
13	67,586.04	1.55	1,134.52	5.01	423.91	0.00	579.28	921.58	1.231	0.012	0.000	0.511
14	224,266.91	5.15	2,139.60	36.43	590.08	533.94	590.20	1,678.76	1.275	0.062	0.250	0.276
15	75,373.09	1.73	1,192.34	179.90	440.12	179.90	0.00	973.22	1.225	0.409	0.151	0.000
16	38,510.01	0.88	874.78	14.33	334.10	14.33	385.01	695.65	1.257	0.043	0.016	0.440
17	40,051.13	0.92	792.24	76.57	231.06	0.00	359.18	709.43	1.117	0.331	0.000	0.453
18	364,391.88	8.37	3,178.77	329.39	693.18	681.75	682.72	2,139.88	1.485	0.475	0.214	0.215
19	67,406.86	1.55	1,219.38	30.01	460.19	124.42	463.50	920.36	1.325	0.065	0.102	0.380
20	182,826.97	4.20	2,288.70	25.02	559.84	844.13	0.00	1,515.74	1.510	0.045	0.369	0.000
21	122,334.37	2.81	1,620.07	25.02	199.43	226.19	0.00	1,239.88	1.307	0.125	0.140	0.000
22	29,429.74	0.68	823.05	63.05	285.73	151.94	0.00	608.13	1.353	0.221	0.185	0.000

Table A.6 (continued)

Parcel ID	Building Name	Address	Building Use	Footprint Area (Sq. Ft.)	Total Floor Area (Sq. Ft.)	Floor Area Ratio	Year Built	Number of Floors
				S(f)	S(t)	FAR		
1	Buckhead Station	One Buckhead Loop	Retail	137,000	236,000	0.485	1996	2
2	On the Border Mexican Grill	One Buckhead Loop	Restaurant	6,754	6,754	0.451	1996	1
3	Building under Construction	3459 Buckhead Loop	N/A	0	0	0.000		0
4	One Capitol City Plaza	3350 Peachtree Rd	Office	53,000	410,128	1.629	1989	17
5	One Buckhead Loop	3334 Peachtree Rd	Condominium	18,800	300,000	8.975	1996	18
6	Building under Construction	3336 Peachtree Rd	N/A	0	0	0.000		0
7	Ivy Place	3423 Piedmont Rd	Office	40,000	183,751	2.884	1985	6
8	Tower Place Drive		N/A	0	0	0.000	1996	0
9	Tower Place 100	3340 Peachtree Rd	Office	153,000	981,702	5.195	1974	29
10	3405 Piedmont	3405 Piedmont Rd	Office	54,300	180,581	2.166	1985	5
11	Tower Place 200	3348 Peachtree Rd	Office	58,800	349,096	5.335	1998	14
12	Tower Place Drive		N/A	0	0	0.000	1975	0
13	DoubleTree Hotel - Atlanta Buckhead	3342 Peachtree Rd	Hotel	33,000	90,000	1.332	1975	6
14	Tower Walk	3365 Piedmont Rd	Retail	154,000	300,000	1.338	1974	2
15	Parking Lot	3344 Peachtree Rd	N/A	0	0	0.000		0
16	Parking Lot	3344 Peachtree Rd	N/A	0	0	0.000		0
17	Courtyard Buckhead	3332 Peachtree Rd	Hotel	28,000	250,000	6.242	1996	10
18	Open Space, Parking Lot	3300 Piedmont Rd	N/A	0	0	0.000		0
19	American InterContinental University	3330 Peachtree Rd	Office	14,490	60,798	0.902	1975	5
20	Open Green Space	3280 Peachtree Rd	N/A	0	0	0.000		0
21	Grand Hyatt Atlanta	3300 Peachtree Rd	Hotel	65,000	430,000	3.515	1990	25
22	No Building	3314 Peachtree Rd	N/A	0	0	0.000		0

Table A.7 Parcel and Building Data in the Tower Place Block, 2005

Parcel ID	Area (Sq. Ft.)	Area (Acre)	Perimeter (Ft.)	Shortest Side (Ft.)	Longest Side (Ft.)	Street Frontage (Ft.)	Internal Road Frontage (Ft.)	Perimeter of Circle with the same area A(p)	Compact-ness	Ratio of Shortest Side/Longest Side	Street Frontage Ratio	Internal Road Frontage Ratio
	S(p1)	S(p2)	P(p)	L(s)	L(l)	L(f)	L(i)	P(m)	P(p)/P(m)	L(s)/L(l)	L(f)/P(p)	L(i)/P(p)
1	486243.17	11.16	4062.54	17.14	759.85	754.33	759.85	2,471.90	1.643	0.023	0.186	0.187
2	14987.81	0.34	490.32	24.51	137.48	0.00	94.12	433.98	1.130	0.178	0.000	0.192
3	71807.60	1.65	1084.65	28.36	306.87	320.67	515.90	949.93	1.142	0.092	0.296	0.476
4	129362.50	2.97	1436.92	26.53	376.39	0.00	271.07	1,275.00	1.127	0.070	0.000	0.189
5	33426.35	0.77	715.04	54.38	190.79	0.00	128.77	648.11	1.103	0.285	0.000	0.180
6	172638.26	3.96	1749.38	60.37	550.82	0.00	550.82	1,472.90	1.188	0.110	0.000	0.315
7	63713.04	1.46	1004.05	15.66	258.24	434.99	0.00	894.79	1.122	0.061	0.433	0.000
8	19968.21	0.46	1035.14	45.70	271.07	0.00	0.00	500.93	2.066	0.169	0.000	0.000
9	122390.19	2.81	1597.23	13.49	572.42	112.58	572.42	1,240.16	1.288	0.024	0.070	0.358
10	36638.16	0.84	773.94	84.22	225.48	0.00	488.09	678.53	1.141	0.374	0.000	0.631
11	188974.26	4.34	2017.74	36.43	501.18	0.00	452.38	1,541.01	1.309	0.073	0.000	0.224
12	83359.81	1.91	1274.95	212.78	462.51	242.76	0.00	1,023.49	1.246	0.460	0.190	0.000
13	65431.04	1.50	1051.04	196.35	324.10	0.00	212.69	906.77	1.159	0.606	0.000	0.202
14	138313.26	3.18	3941.93	5.01	678.64	197.24	0.00	1,318.37	2.990	0.007	0.050	0.000
15	64336.49	1.48	1137.92	5.01	423.91	0.00	579.28	899.15	1.266	0.012	0.000	0.509
16	224266.91	5.15	2139.60	36.43	590.08	533.94	590.20	1,678.76	1.275	0.062	0.250	0.276
17	117132.65	2.69	1402.32	14.33	375.97	194.24	385.01	1,213.23	1.156	0.038	0.139	0.275
18	40051.13	0.92	792.24	76.57	231.06	0.00	359.18	709.43	1.117	0.331	0.000	0.453
19	248214.25	5.70	3274.20	30.73	682.72	347.13	515.90	1,766.11	1.854	0.045	0.106	0.158
20	67406.86	1.55	1219.38	30.01	460.19	124.42	463.50	920.36	1.325	0.065	0.102	0.380
21	37754.09	0.87	795.09	16.60	213.02	0.00	172.47	688.79	1.154	0.078	0.000	0.217
22	93027.97	2.14	1242.74	16.60	373.14	249.23	368.49	1,081.21	1.149	0.044	0.201	0.297
23	122334.37	2.81	1620.07	25.02	199.43	226.19	344.40	1,239.88	1.307	0.125	0.140	0.213
24	179630.59	4.12	1913.82	25.02	549.90	976.70	0.00	1,502.43	1.274	0.046	0.510	0.000
25	18021.70	0.41	553.95	8.18	122.84	104.83	222.92	475.89	1.164	0.067	0.189	0.402

Table A.7 (continued)

Parcel ID	Building Name	Address	Building Use	Footprint Area (Sq. Ft.)	Total Floor Area (Sq. Ft.)	Floor Area Ratio	Year Built	Number of Floors
				S(f)	S(t)	FAR		
1	Buckhead Station	One Buckhead Loop	Retail	137,000	236,000	0.485	1996	2
2	On the Border Mexican Grill	One Buckhead Loop	Restaurant	6,754	6,754	0.451	1996	1
3	SpringHill Suites Atlanta Buckhead, Bank of Wachovia	3459 Buckhead Loop, 3330 Piedmont Rd	Hotel, Office	22,500	135,500	1.887	2005	11, 1
4	Parking Lot	3360 Peachtree Rd	N/A	0	0	0.000		0
5	One Buckhead Loop	3334 Peachtree Rd	Condominium	18,800	300,000	8.975	1996	18
6	Buckhead Grand	3338 Peachtree Rd	Condominium	42,500	431,000	2.497	2004	37
7	Ivy Place	3423 Piedmont Rd	Office	40,000	183,751	2.884	1985	6
8	Tower Place Drive		N/A	0	0	0.000	1996	0
9	One Capitol City Plaza	3350 Peachtree Rd	Office	53,000	410,128	3.351	1989	17
10	Buckhead Park	3338 Peachtree Rd	Public	0	0	0.000		0
11	Tower Place 100	3340 Peachtree Rd	Office	153,000	981,702	5.195	1974	29
12	3405 Piedmont	3405 Piedmont Rd	Office	54,300	180,581	2.166	1985	5
13	Tower Place 200	3348 Peachtree Rd	Office	58,800	349,096	5.335	1998	14
14	Tower Place Drive		N/A	0	0	0.000	1975	
15	DoubleTree Hotel - Atlanta Buckhead	3342 Peachtree Rd	Hotel	33,000	90,000	1.399	1975	6
16	Tower Walk	3365 Piedmont Rd	Retail	154,000	300,000	1.338	1974	2
17	Building under Construction	3344 Peachtree Rd	N/A	0	0	0.000		0
18	Courtyard Buckhead	3332 Peachtree Rd	Hotel	28,000	250,000	6.242	1996	10
19	Building under Construction	3318 Peachtree Rd	N/A	0	0	0.000		0
20	American InterContinental University	3330 Peachtree Rd	Office	14,490	60,798	0.902	1975	5
21	Building under Construction	3322 Peachtree Rd	N/A	0	0	0.000		0
22	Building under Construction	3324 Peachtree Rd	N/A	0	0	0.000		0
23	Grand Hyatt Atlanta	3300 Peachtree Rd	Hotel	65,000	430,000	3.515	1990	25
24	Open Green Space	3280 Peachtree Rd	N/A	0	0	0.000		0
25	No Building	3314 Peachtree Rd	N/A	0	0	0.000		

Table A.8 Parcel and Building Data in the Tower Place Block, 2008

Parcel ID	Area (Sq. Ft.)	Area (Acre)	Perimeter (Ft.)	Shortest Side (Ft.)	Longest Side (Ft.)	Street Frontage (Ft.)	Internal Road Frontage (Ft.)	Perimeter of Circle with the same area A(p)	Compact-ness	Ratio of Shortest Side/Longest Side	Street Frontage Ratio	Internal Road Frontage Ratio
	S(p1)	S(p2)	P(p)	L(s)	L(l)	L(f)	L(i)	P(m)	P(p)/P(m)	L(s)/L(l)	L(f)/P(p)	L(i)/P(p)
1	486,243.17	11.16	4,062.54	17.14	759.85	754.33	759.85	2,471.90	1.643	0.023	0.186	0.187
2	14,987.81	0.34	490.32	24.51	137.48	0.00	94.12	433.98	1.130	0.178	0.000	0.192
3	71,807.60	1.65	1,084.65	28.36	306.87	320.67	515.90	949.93	1.142	0.092	0.296	0.476
4	129,362.50	2.97	1,436.92	26.53	376.39	0.00	271.07	1,275.00	1.127	0.070	0.000	0.189
5	33,426.35	0.77	715.04	54.38	190.79	0.00	128.77	648.11	1.103	0.285	0.000	0.180
6	105,676.64	2.43	1,470.72	26.25	428.08	0.00	776.80	1,152.38	1.276	0.061	0.000	0.528
7	63,713.04	1.46	1,004.05	15.66	258.24	434.99	0.00	894.79	1.122	0.061	0.433	0.000
8	66,961.61	1.54	1,158.29	26.25	359.17	0.00	202.10	917.31	1.263	0.073	0.000	0.174
9	19,968.21	0.46	1,035.14	45.70	271.07	0.00	0.00	500.93	2.066	0.169	0.000	0.000
10	122,390.19	2.81	1,597.23	13.49	572.42	112.58	572.42	1,240.16	1.288	0.024	0.070	0.358
11	36,638.16	0.84	773.94	84.22	225.48	0.00	488.09	678.53	1.141	0.374	0.000	0.631
12	188,974.26	4.34	2,017.74	36.43	501.18	0.00	452.38	1,541.01	1.309	0.073	0.000	0.224
13	83,359.81	1.91	1,274.95	212.78	462.51	242.76	0.00	1,023.49	1.246	0.460	0.190	0.000
14	65,431.04	1.50	1,051.04	196.35	324.10	0.00	212.69	906.77	1.159	0.606	0.000	0.202
15	138,313.26	3.18	3,941.93	5.01	678.64	197.24	0.00	1,318.37	2.990	0.007	0.050	0.000
16	64,336.49	1.48	1,137.92	5.01	423.91	0.00	579.28	899.15	1.266	0.012	0.000	0.509
17	224,266.91	5.15	2,139.60	36.43	590.08	533.94	590.20	1,678.76	1.275	0.062	0.250	0.276
18	117,132.65	2.69	1,402.32	14.33	375.97	194.24	385.01	1,213.23	1.156	0.038	0.139	0.275
19	40,051.13	0.92	792.24	76.57	231.06	0.00	359.18	709.43	1.117	0.331	0.000	0.453
20	248,214.25	5.70	3,274.20	30.73	682.72	347.13	515.90	1,766.11	1.854	0.045	0.106	0.158
21	67,406.86	1.55	1,219.38	30.01	460.19	124.42	463.50	920.36	1.325	0.065	0.102	0.380
22	37,754.09	0.87	795.09	16.60	213.02	0.00	172.47	688.79	1.154	0.078	0.000	0.217
23	93,027.97	2.14	1,242.74	16.60	373.14	249.23	368.49	1,081.21	1.149	0.044	0.201	0.297
24	122,334.37	2.81	1,620.07	25.02	199.43	226.19	344.40	1,239.88	1.307	0.125	0.140	0.213
25	179,630.59	4.12	1,913.82	25.02	549.90	976.70	0.00	1,502.43	1.274	0.046	0.510	0.000
26	18,021.70	0.41	553.95	8.18	122.84	104.83	222.92	475.89	1.164	0.067	0.189	0.402

Table A.8 (continued)

Parcel ID	Building Name	Address	Building Use	Footprint Area (Sq. Ft.)	Total Floor Area (Sq. Ft.)	Floor Area Ratio	Year Built	Number of Floors
				S(f)	S(t)	FAR		
1	Buckhead Station	One Buckhead Loop	Retail	137,000	236,000	0.485	1996	2
2	On the Border Mexican Grill	One Buckhead Loop	Restaurant	6,754	6,754	0.451	1996	1
3	SpringHill Suites Atlanta Buckhead & Bank of Wachovia	3459 Buckhead Loop, 3330 Piedmont Rd	Hotel, Office	22,500	135,500	1.887	2005	11, 1
4	Parking Lot	3350 Peachtree Rd	N/A	0	0	0.000		
5	One Buckhead Loop	3334 Peachtree Rd	Condominium	18,800	300,000	8.975	1996	18
6	The Buckhead Church	3336 Peachtree Rd	Church	72,000	190,000	1.798	2006	5
7	Ivy Place	3423 Piedmont Rd	Office	40,000	183,751	2.884	1985	6
8	Buckhead Grand	3338 Peachtree Rd	Condominium	42,500	431,000	6.437	2004	37
9	Tower Place Drive		N/A	0	0	0.000		
10	One Capitol City Plaza	3350 Peachtree Rd	Office	53,000	410,128	3.351	1989	17
11	Buckhead Park	3338 Peachtree Rd	Public	0	0	0.000		
12	Tower Place 100	3340 Peachtree Rd	Office	153,000	981,702	5.195	1974	29
13	3405 Piedmont	3405 Piedmont Rd	Office	54,300	180,581	2.166	1985	5
14	Tower Place 200	3348 Peachtree Rd	Office	58,800	349,096	5.335	1998	14
15	Tower Place Drive		N/A	0	0	0.000		
16	DoubleTree Hotel - Atlanta Buckhead	3342 Peachtree Rd	Hotel	33,000	90,000	1.399	1975	6
17	Tower Walk	3365 Piedmont Rd	Retail	154,000	300,000	1.338	1974	2
18	Tower Place 300, Sovereign	3344 Peachtree Rd	Office, Condominium, Retail	67,500	1,410,361	12.041	2008	50
19	Courtyard Buckhead	3332 Peachtree Rd	Hotel	28,000	250,000	6.242	1996	10
20	Terminus 200 under Construction	3284 Piedmont Rd	Office	0	0	0.000		0
21	American InterContinental University	3330 Peachtree Rd	Office	14,490	60,798	0.902	1975	5
22	3322 Peachtree Rd	3322 Peachtree Rd	Parking	16,000	50,000	1.324	2006	6
23	Realm	3324 Peachtree Rd	Office, Condominium	23,000	410,000	4.407	2006	30
24	Grand Hyatt Atlanta	3300 Peachtree Rd	Hotel	65,000	430,000	3.515	1990	25
25	Terminus 100 (10 Terminus Place)	3280 Piedmont Rd	Office, Retail	95,000	1,410,000	7.849	2008	33
26	3314 Peachtree Rd under Construction	3314 Peachtree Rd	Office	0	0	0.000		0

APPENDIX B

MOVEMENT OBSERVATION IN THE TOWER PLACE BLOCK AND THE EDGE STREETS AT WEEKDAY AND WEEKEND

Table B.1 Movement Observation for Gates 1 to 4 at Weekday

			Gate 1			Gate 2			Gate 3			Gate 4		
			Tower Walk			Tower Place 100			10 Terminus Place			Hyatt		
Time Slot	Date	Day	Time Start	Vehicle	Pedestrian	Time Start	Vehicle	Pedestrian	Time Start	Vehicle	Pedestrian	Time Start	Vehicle	Pedestrian
7:30AM - 9:30AM	11/5/2008	Wednesday	8:02:10	17	2	8:05:00	10	2	7:58:30	10	3	7:55:05	7	1
	11/6/2008	Thursday	7:53:55	12	0	7:53:55	5	4	7:49:05	5	2	7:45:40	12	2
	11/5/2008	Wednesday	8:55:10	17	2	8:58:05	9	6	8:52:40	5	3	8:49:40	10	2
	11/6/2008	Thursday	8:41:00	17	2	8:41:00	11	5	8:37:05	7	3	8:33:40	10	0
9:30AM - 11:30AM	11/5/2008	Wednesday	9:44:40	10	2	9:44:40	10	3	9:40:50	3	5	9:36:30	5	2
	11/6/2008	Thursday	9:37:25	10	0	9:37:25	11	4	9:33:35	4	10	9:30:10	12	1
	11/5/2008	Wednesday	10:26:55	8	0	10:26:55	9	1	10:22:10	2	3	10:18:40	6	2
	11/6/2008	Thursday	10:21:10	17	0	10:21:10	11	5	10:18:35	4	2	10:14:00	7	4
11:30AM - 1:30PM	11/5/2008	Wednesday	11:34:10	10	3	11:34:10	10	10	11:30:45	5	4	11:27:35	6	1
	11/6/2008	Thursday	11:36:00	13	4	11:36:00	13	16	11:33:30	5	6	11:30:30	10	1
	11/5/2008	Wednesday	12:18:05	16	7	12:18:05	14	21	12:15:40	9	10	12:12:30	8	3
	11/6/2008	Thursday	12:21:35	13	4	12:21:35	11	18	12:17:55	5	3	12:14:40	9	5
1:30PM - 3:30PM	11/3/2008	Monday	14:13:40	10	2	14:10:50	12	10	14:06:00	3	9	14:02:00	8	5
	11/4/2008	Tuesday	13:52:30	11	1	14:03:10	15	9	13:59:45	6	3	13:56:05	15	2
	11/3/2008	Monday	14:43:05	16	5	14:46:20	10	6	14:39:15	4	7	14:35:55	6	3
	11/4/2008	Tuesday	14:52:15	9	4	14:55:20	11	7	14:48:10	7	5	14:44:50	9	1
3:30PM - 5:30PM	11/3/2008	Monday	15:39:10	12	1	15:42:15	12	11	15:35:20	5	3	15:32:50	8	9
	11/4/2008	Tuesday	15:43:45	9	6	15:46:45	10	11	15:40:00	0	1	15:36:10	14	2
	11/3/2008	Monday	16:32:25	15	3	16:36:15	10	5	16:28:00	4	3	16:24:00	7	2
	11/4/2008	Tuesday	16:39:00	25	4	16:42:00	11	4	16:35:00	3	5	16:31:10	15	2
5:30PM - 7:30PM	11/3/2008	Monday	17:31:05	22	2	17:34:20	22	8	17:26:30	6	4	17:23:00	19	4
	11/4/2008	Tuesday	17:32:05	20	2	17:35:05	19	11	17:29:20	6	4	17:25:05	18	1
	11/10/2008	Monday	18:21:30	28	3	18:21:30	21	4	18:18:55	5	1	18:15:35	10	5
	11/11/2008	Tuesday	18:23:35	21	1	18:23:35	20	2	18:19:55	6	1	18:16:45	11	2

Table B.2 Movement Observation for Gates 5 to 8 at Weekday

			Gate 5			Gate 6			Gate 7			Gate 8		
			AIU			Tower Place 200			Buckhead Church			Peachtree Rd @ One Capital City Plaza		
Time Slot	Date	Day	Time Start	Vehicle	Pedestrian	Time Start	Vehicle	Pedestrian	Time Start	Vehicle	Pedestrian	Time Start	Vehicle	Pedestrian
7:30AM - 9:30AM	11/5/2008	Wednesday	8:08:20	14	6	8:17:00	0	3	8:26:05	16	2	8:11:45	129	6
	11/6/2008	Thursday	7:56:15	14	3	8:04:55	0	2	8:09:25	13	1	8:00:55	104	15
	11/5/2008	Wednesday	9:01:05	20	2	9:08:05	0	1	9:13:50	27	0	9:04:55	103	17
	11/6/2008	Thursday	8:44:35	16	3	8:52:45	0	10	8:58:05	22	4	8:48:10	108	23
9:30AM - 11:30AM	11/5/2008	Wednesday	9:46:40	8	9	9:53:45	14	5	9:57:20	15	1	9:50:55	83	6
	11/6/2008	Thursday	9:40:55	19	4	9:48:05	10	4	9:51:35	27	1	9:44:20	92	11
	11/5/2008	Wednesday	10:30:15	8	0	10:38:20	16	3	10:41:45	15	2	10:33:35	91	16
	11/6/2008	Thursday	10:25:35	15	3	10:32:55	10	6	10:36:45	18	1	10:28:00	93	6
11:30AM - 1:30PM	11/5/2008	Wednesday	11:37:10	9	8	11:44:00	16	10	11:48:25	26	2	11:40:35	150	11
	11/6/2008	Thursday	11:40:20	18	11	11:47:50	23	8	11:51:35	32	4	11:43:45	115	20
	11/5/2008	Wednesday	12:21:10	21	6	12:29:30	13	15	12:32:00	28	1	12:25:30	110	15
	11/6/2008	Thursday	12:24:55	27	10	12:32:55	24	15	12:36:25	41	4	12:28:45	118	18
1:30PM - 3:30PM	11/3/2008	Monday	13:54:55	19	6	13:49:45	13	13	13:40:20	30	1	13:58:45	100	12
	11/4/2008	Tuesday	14:06:20	17	9	14:14:00	18	8	14:17:45	27	4	14:10:00	136	11
	11/3/2008	Monday	14:50:25	8	4	14:59:50	11	3	15:03:10	30	1	14:54:25	128	5
	11/4/2008	Tuesday	14:58:30	16	7	15:06:15	12	6	15:10:10	30	0	15:02:00	104	10
3:30PM - 5:30PM	11/3/2008	Monday	15:46:15	7	7	15:54:35	10	3	15:58:30	25	2	15:50:05	131	15
	11/4/2008	Tuesday	15:50:20	13	1	15:58:35	9	4	16:02:30	28	3	15:54:10	106	7
	11/3/2008	Monday	16:40:00	14	9	16:48:55	0	5	16:53:00	34	3	16:43:40	109	13
	11/4/2008	Tuesday	16:45:30	10	6	16:53:05	0	8	16:59:40	39	1	16:49:05	139	12
5:30PM - 7:30PM	11/3/2008	Monday	17:38:00	23	12	17:47:15	0	8	17:56:00	35	1	17:41:40	150	14
	11/4/2008	Tuesday	17:39:25	21	5	17:46:45	0	3	17:53:55	31	0	17:42:05	150	13
	11/10/2008	Monday	18:25:45	21	11	18:36:35	8	0	18:39:00	26	2	18:31:55	114	21
	11/11/2008	Tuesday	18:28:50	22	7	18:36:25	5	9	18:39:05	36	2	18:31:15	154	10

Table B.3 Movement Observation for Gates 9 to 12 at Weekday

			Gate 9			Gate 10			Gate 11			Gate 12		
			Buckhead Loop @ SpringHill Suites			Piedmont Rd @ Tower Walk			Piedmont Rd @ 10 Terminus Place			Peachtree Rd @ 10 Terminus Place		
Time Slot	Date	Day	Time Start	Vehicle	Pedestrian	Time Start	Vehicle	Pedestrian	Time Start	Vehicle	Pedestrian	Time Start	Vehicle	Pedestrian
7:30AM - 9:30AM	11/5/2008	Wednesday	8:22:25	137	2	8:32:40	108	1	8:40:20	81	3	8:45:10	109	8
	11/6/2008	Thursday	8:13:15	166	0	8:21:05	97	2	8:24:55	88	5	8:29:35	111	3
	11/5/2008	Wednesday	9:17:35	115	1	9:24:05	83	7	9:28:15	72	6	9:32:35	89	7
	11/6/2008	Thursday	9:02:10	150	1	9:10:50	100	3	9:21:35	57	6	9:25:40	104	8
9:30AM - 11:30AM	11/5/2008	Wednesday	10:01:40	92	1	10:07:00	67	5	10:11:55	67	6	10:15:55	102	8
	11/6/2008	Thursday	9:55:30	116	0	10:01:05	92	2	10:06:10	58	5	10:10:25	86	10
	11/5/2008	Wednesday	10:45:30	99	0	10:51:25	83	2	10:55:05	73	9	11:06:30	81	0
	11/6/2008	Thursday	10:40:35	87	1	10:46:40	77	0	10:50:30	64	8	10:54:45	108	7
11:30AM - 1:30PM	11/5/2008	Wednesday	11:52:20	106	3	11:58:00	88	6	12:02:50	90	5	12:08:55	106	18
	11/6/2008	Thursday	11:55:20	113	2	12:01:25	114	7	12:05:35	75	8	12:10:15	99	14
	11/5/2008	Wednesday	12:35:25	111	2	12:42:20	93	8	12:49:50	89	7	12:59:50	89	6
	11/6/2008	Thursday	12:40:30	110	3	12:45:00	110	11	12:49:25	103	10	12:55:45	111	16
1:30PM - 3:30PM	11/3/2008	Monday	13:44:35	94	2	14:19:50	86	5	14:23:00	76	6	14:28:30	103	8
	11/4/2008	Tuesday	14:21:40	119	1	14:31:25	94	5	14:35:30	99	5	14:40:10	140	4
	11/3/2008	Monday	15:07:25	99	2	15:17:00	101	7	15:21:35	88	3	15:27:00	106	8
	11/4/2008	Tuesday	15:14:15	123	0	15:21:30	84	4	15:25:30	68	4	15:31:30	137	6
3:30PM - 5:30PM	11/3/2008	Monday	16:02:30	92	5	16:08:35	103	6	16:13:10	97	5	16:18:30	117	3
	11/4/2008	Tuesday	16:06:30	109	1	16:13:45	99	2	16:22:40	80	9	16:27:25	119	2
	11/3/2008	Monday	16:57:15	115	0	17:03:05	115	6	17:13:45	98	6	17:18:40	136	5
	11/4/2008	Tuesday	17:03:20	124	0	17:12:40	105	1	17:16:35	89	1	17:21:25	126	6
5:30PM - 7:30PM	11/3/2008	Monday	18:00:50	142	0	18:06:30	116	3	18:13:45	101	10	18:17:25	144	7
	11/4/2008	Tuesday	17:57:35	121	2	18:03:35	92	2	18:07:55	89	10	18:13:00	138	7
	11/10/2008	Monday	18:43:45	104	4	18:49:20	108	3	18:54:00	99	5	18:59:55	124	14
	11/11/2008	Tuesday	18:43:50	115	0	18:49:00	97	4	18:53:25	86	6	18:59:35	120	7

Table B.4 Movement Observation for Gates 1 to 4 at Weekend

			Gate 1			Gate 2			Gate 3			Gate 4		
			Tower Walk			Tower Place 100			10 Terminus Place			Hyatt		
Time Slot	Date	Day	Time Start	Vehicle	Pedestrian	Time Start	Vehicle	Pedestrian	Time Start	Vehicle	Pedestrian	Time Start	Vehicle	Pedestrian
7:30AM - 9:30AM	11/8/2008	Saturday	7:58:15	4	0	7:58:15	5	2	7:54:30	0	1	7:51:00	3	3
	11/9/2008	Sunday	7:57:05	3	3	7:57:05	6	2	7:54:40	1	0	7:51:35	3	1
	11/8/2008	Saturday	8:43:25	4	0	8:43:25	4	3	8:39:45	3	0	8:35:10	3	2
	11/9/2008	Sunday	8:37:45	3	1	8:37:45	4	2	8:33:15	2	0	8:30:15	3	1
9:30AM - 11:30AM	11/8/2008	Saturday	9:40:15	5	0	9:40:15	6	1	9:36:15	1	2	9:33:00	9	1
	11/9/2008	Sunday	9:37:40	5	0	9:37:40	9	5	9:33:45	4	2	9:30:35	2	6
	11/8/2008	Saturday	10:24:00	6	3	10:24:00	6	7	10:20:25	3	2	10:16:45	4	1
	11/2/2008	Sunday	10:32:00	11	6	10:36:35	20	3	10:50:35	3	0	10:46:35	9	0
11:30AM - 1:30PM	11/8/2008	Saturday	11:38:35	5	0	11:41:05	5	5	11:34:25	2	8	11:30:40	6	2
	11/2/2008	Sunday	11:50:05	4	1	11:53:40	5	1	12:21:05	1	0	11:45:45	7	0
	11/8/2008	Saturday	12:34:00	3	3	12:38:15	11	10	12:30:45	4	4	12:26:35	8	2
	11/9/2008	Sunday	12:40:50	17	1	12:40:50	16	5	12:36:15	4	5	12:33:00	9	4
1:30PM - 3:30PM	11/8/2008	Saturday	13:38:00	8	5	13:38:00	11	11	13:34:55	5	4	13:30:55	7	2
	11/2/2008	Sunday	13:54:55	4	2	13:58:30	3	1	14:18:05	1	2	14:10:10	6	1
	11/8/2008	Saturday	14:29:45	12	4	14:29:45	10	13	14:25:00	2	0	14:22:35	4	1
	11/2/2008	Sunday	14:57:40	5	1	15:00:35	12	1	14:53:30	2	2	14:49:45	5	1
3:30PM - 5:30PM	11/8/2008	Saturday	15:37:55	12	6	15:37:55	12	4	15:33:05	1	0	15:30:30	11	5
	11/2/2008	Sunday	15:55:35	10	2	15:57:55	6	3	15:51:30	1	3	15:47:40	3	2
	11/8/2008	Saturday	16:25:30	14	4	16:25:30	14	7	16:21:40	1	0	16:17:05	10	1
	11/2/2008	Sunday	16:47:20	9	4	16:59:05	10	6	16:55:10	2	3	16:51:00	4	2
5:30PM - 7:30PM	11/8/2008	Saturday	17:36:25	7	3	17:36:25	11	2	17:33:55	1	0	17:30:30	11	3
	11/9/2008	Sunday	17:36:30	6	1	17:36:30	6	2	17:33:05	2	0	17:30:50	7	3
	11/8/2008	Saturday	18:21:40	8	2	18:21:40	5	3	18:17:50	4	1	18:13:20	11	0
	11/9/2008	Sunday	18:23:20	11	2	18:23:20	14	2	18:20:55	5	0	18:17:50	13	0

Table B.5 Movement Observation for Gates 5 to 8 at Weekend

			Gate 5			Gate 6			Gate 7			Gate 8		
			AIU			Tower Place 200			Buckhead Church			Peachtree Rd @ One Capital City Plaza		
Time Slot	Date	Day	Time Start	Vehicle	Pedestrian	Time Start	Vehicle	Pedestrian	Time Start	Vehicle	Pedestrian	Time Start	Vehicle	Pedestrian
7:30AM - 9:30AM	11/8/2008	Saturday	8:02:50	8	0	8:10:10	5	2	8:13:35	4	2	8:06:55	26	10
	11/9/2008	Sunday	8:00:15	5	0	8:07:05	3	0	8:10:20	10	2	8:03:25	20	11
	11/8/2008	Saturday	8:46:35	2	1	8:53:30	3	3	8:57:55	7	1	8:49:45	52	10
	11/9/2008	Sunday	8:40:55	8	5	8:48:40	16	0	8:51:30	67	3	8:43:10	30	4
9:30AM - 11:30AM	11/8/2008	Saturday	9:43:45	8	3	9:51:20	8	1	9:55:00	10	0	9:47:15	106	6
	11/9/2008	Sunday	9:40:55	1	4	9:47:40	5	1	9:50:55	12	0	9:43:55	57	14
	11/8/2008	Saturday	10:27:15	8	2	10:34:35	6	4	10:38:15	12	1	10:30:30	98	9
	11/2/2008	Sunday	10:57:10	14	0	11:17:50	12	6	11:12:30	18	3	11:00:25	89	7
11:30AM - 1:30PM	11/8/2008	Saturday	11:45:55	5	5	11:53:45	11	0	11:57:55	14	0	11:49:20	113	14
	11/2/2008	Sunday	11:51:00	6	3	12:05:30	6	2	12:04:40	26	0	12:00:55	90	10
	11/8/2008	Saturday	12:41:00	10	5	12:49:35	10	5	12:52:05	27	3	12:45:30	134	13
	11/9/2008	Sunday	12:43:55	10	2	12:50:00	11	5	12:53:20	18	2	12:46:15	126	8
1:30PM - 3:30PM	11/8/2008	Saturday	13:42:30	7	1	13:49:55	12	3	13:53:15	25	0	13:45:05	142	13
	11/2/2008	Sunday	14:01:00	6	3	14:23:25	5	0	14:22:30	32	0	14:05:30	115	2
	11/8/2008	Saturday	14:32:10	8	8	14:40:20	15	2	14:43:00	23	1	14:36:35	124	14
	11/2/2008	Sunday	15:04:00	6	3	15:12:00	10	0	15:16:00	20	1	15:07:25	95	16
3:30PM - 5:30PM	11/8/2008	Saturday	15:40:05	8	5	15:47:20	13	3	15:51:15	30	2	15:44:35	137	6
	11/2/2008	Sunday	16:02:05	6	5	16:10:25	7	3	16:14:30	15	0	16:06:00	108	6
	11/8/2008	Saturday	16:28:50	7	2	16:35:25	10	0	16:39:10	14	1	16:31:10	135	10
	11/2/2008	Sunday	17:02:30	7	2	17:10:25	11	3	17:14:25	23	1	17:06:10	82	5
5:30PM - 7:30PM	11/8/2008	Saturday	17:39:25	14	5	17:47:45	7	3	17:51:30	25	0	17:43:40	133	19
	11/9/2008	Sunday	17:39:40	8	2	17:46:15	21	2	17:57:00	42	1	17:42:40	98	21
	11/8/2008	Saturday	18:24:00	13	1	18:32:40	10	1	18:36:35	18	1	18:28:45	90	11
	11/9/2008	Sunday	18:27:35	10	11	18:34:40	10	2	18:37:40	10	2	18:30:40	97	14

Table B.6 Movement Observation for Gates 9 to 12 at Weekend

			Gate 9			Gate 10			Gate 11			Gate 12		
			Buckhead Loop @ SpringHill Suites			Piedmont Rd @ Tower Walk			Piedmont Rd @ 10 Terminus Place			Peachtree Rd @ 10 Terminus Place		
Time Slot	Date	Day	Time Start	Vehicle	Pedestrian	Time Start	Vehicle	Pedestrian	Time Start	Vehicle	Pedestrian	Time Start	Vehicle	Pedestrian
7:30AM - 9:30AM	11/8/2008	Saturday	8:17:20	53	0	8:24:45	31	0	8:27:30	21	2	8:31:25	45	7
	11/9/2008	Sunday	8:14:35	31	1	8:18:15	21	3	8:22:35	19	3	8:26:20	36	5
	11/8/2008	Saturday	9:00:35	35	0	9:10:30	44	0	9:14:25	37	5	9:19:00	60	6
	11/9/2008	Sunday	8:56:35	36	1	9:02:10	30	1	9:12:55	17	2	9:16:55	23	1
9:30AM - 11:30AM	11/8/2008	Saturday	9:58:55	68	0	10:04:25	73	4	10:08:30	46	2	10:12:50	87	9
	11/9/2008	Sunday	9:54:45	58	0	9:59:10	55	0	10:03:10	48	2	10:07:30	57	4
	11/8/2008	Saturday	10:42:15	77	0	10:48:55	75	6	10:57:50	87	14	11:03:50	107	10
	11/2/2008	Sunday	11:03:30	68	0	11:31:30	70	3	11:41:35	62	3	11:46:00	94	3
11:30AM - 1:30PM	11/8/2008	Saturday	12:02:30	78	0	12:09:15	88	3	12:13:00	85	6	12:20:05	133	17
	11/2/2008	Sunday	12:15:45	72	0	12:32:10	82	13	12:28:30	56	6	12:39:30	140	5
	11/8/2008	Saturday	12:56:05	81	0	13:01:15	98	2	13:06:30	90	3	13:11:05	135	5
	11/9/2008	Sunday	12:57:05	72	1	13:03:30	82	2	13:08:35	69	3	13:12:00	96	8
1:30PM - 3:30PM	11/8/2008	Saturday	13:57:10	90	0	14:06:45	104	3	14:10:00	92	7	14:17:30	140	6
	11/2/2008	Sunday	14:26:40	79	0	14:37:20	63	5	14:37:45	64	5	14:43:35	117	6
	11/8/2008	Saturday	14:47:00	119	0	14:53:05	80	1	14:57:05	66	10	15:02:45	153	5
	11/2/2008	Sunday	15:22:30	87	0	15:28:55	74	3	15:33:10	73	2	15:39:20	114	4
3:30PM - 5:30PM	11/8/2008	Saturday	15:55:10	102	0	16:01:25	97	1	16:06:30	79	2	16:12:20	129	7
	11/2/2008	Sunday	16:19:15	74	0	16:27:20	65	8	16:32:05	66	7	16:37:20	101	6
	11/8/2008	Saturday	16:44:30	107	0	16:50:00	82	1	16:59:15	89	12	17:05:20	157	6
	11/2/2008	Sunday	17:18:35	66	0	17:25:35	65	5	17:29:50	50	5	17:35:30	97	1
5:30PM - 7:30PM	11/8/2008	Saturday	17:54:10	85	1	18:00:40	65	1	18:05:50	68	2	18:09:15	116	4
	11/9/2008	Sunday	17:54:05	91	2	18:04:35	70	10	18:08:25	71	6	18:12:15	107	9
	11/8/2008	Saturday	18:39:25	99	0	18:45:35	82	3	18:48:30	81	10	18:53:45	144	14
	11/9/2008	Sunday	18:40:50	71	0	18:44:25	59	5	18:48:00	54	0	18:52:45	96	7

APPENDIX C

THE NOTES OF SOME PARCEL AGREEMENTS WITHIN THE TOWER PLACE BLOCK, 2001

Source:
Sheet 1 and Sheet 2
ALTA/ACSM Land Title Survey
Mayes, Sudderth & Etheredge, Inc.
2217 Roswell Road, Marietta, GA 30062
Ph: 770-971-5407
Date: first created on March 5, 1999; last revised on September 24, 2001
Provided by: the City of Atlanta, Permit Office

1. General utility easement from Peachtree-Piedmont Associates to Georgia Power Company, recorded in Deed Book 6104, page 195, Fulton County, Georgia, Records, Not Locatable. Georgia Power Company claims no further interest except the right to operate, maintain, rebuild and renew its existing facilities within its presently maintained right-of-way.
2. Easement and restrictive covenant agreement between and among Regent Tower Holdings, Inc. and Regent Peachtree Holdings, Inc. and Buckhead Lodging Associates, Limited Partnership and affects Marriott tract and roadway system shaded in blue and other areas of the property not specifically locatable.
3. Water system easement from Capital City Plaza Associates to the City of Atlanta, a municipal corporation of the state of Georgia and recorded in Deed Book 11335, page 37 aforesaid records. Not Locatable.
4. The roadway system is burdened by and benefited by the easements of DB, 20056, PG. 56, DB. 19997, PG. 43, DB. 12864, PG.190, DB. 16232, PG.1.
5. Setback lines are as shown.
6. Indemnity agreement by Regent Tower Holdings, Inc. to the City of Atlanta dated 6/10/97, filed 6/10/97 and recorded at Deed Book 22688, page 105 aforesaid records. (Affects property but is not plottable).
7. Indemnity agreement by Regent Tower Holdings, Inc. to the City of Atlanta dated 6/10/97, filed 6/10/97 and recorded at Deed Book 22688, page 110 aforesaid records. (Affects property but is not plottable).
8. Provisions burdening the property as contained in that Tower Place Easement Agreement by and between Regent Tower Holdings, Inc. and Tower Place, L. P. dated 12/28/95, filed 1/3/96 recorded at Deed Book 20440, page 76, aforesaid records, as amended or restated as follows:

a) By that First Amendment to Tower Place Easement Agreement by and between Regent Tower Holdings, Inc. and Tower Place, L.P. dated 9/11/97, filed 9/12/97 and recorded at Deed Book 23123, page 1. aforesaid records.

b) By that amended and restated Tower Place Easement Agreement between Regent Tower Holdings, Inc., Tower Place, L.P., and Buckhead Hotel Associates, LLC, dated 93099. (Affects property but is not plottable).

9. Provisions burdening the property as contained in that Tower Place 200, first amendment to easement agreement between Regent Tower Holdings, Inc. and Tower Place, L.P., dated 9/30/1999 filed 10/5/1999. First amendment recorded at Deed Book 27742, page 038. Second amendment recorded at Deed Book 30225, page 269, aforesaid records. (Affects property but is not plottable).
10. Grant of easement from Tower Holdings, Inc. to Media One Group, Inc. dated 11/12/98, filed 11/24/98 and recorded at Deed Book 25754, page 209, aforesaid records. (This easement affects the property and is shown on plot).
11. Indemnity agreement by Regent Tower Holdings, Inc. to the City of Atlanta dated 7-12-94, filed 7-15-94 and recorded at Deed Book 18477, page 286, aforesaid records.
12. Indemnity agreement by and between Regent Tower Holdings, Inc. and the Georgia Department of Transportation, dated 10-21-94, filed 8-11-95 and recorded at Deed Book 19905, page 290, aforesaid records.
13. Provisions burdening the property as contained in that Buckhead Loop access easement agreement by and between Charles S. Ackerman, Regent Peachtree Holdings, Inc., a Georgia corporation and Regent Tower Holdings, Inc., a Georgia corporation, dated 4-4-95, filed 4-5-95, recorded at Deed Book 19416, page 221, aforesaid records. Amended and restated on 12-22-00, filed 4-15-01, recorded at Deed Book 30225, page 278 to provisions burdening the property as contained in that Buckhead Loop access easement agreement by and between Charles S. Ackerman, Regent Tower Holdings, Inc., a Georgia corporation, Tower Place, L.P., a Georgia limited partnership, Buckhead Hotel Associates, LLC, a Delaware limited liability company and R.K. Real Estate, L.P., a Georgia limited partnership.
14. Provisions burdening the property as contained in that sewer easement agreement and agreement concerning access easement agreement and cross easement agreement by and between Charles S. Ackerman, Regent Tower Holdings, Inc., a Georgia corporation, and Regent Peachtree Holdings, Inc., a Georgia corporation, dated 4-4-95, filed 4-5-95, recorded at Deed Book 19146, page 258, aforesaid records. Amended on 12-22-00, filed 4-16-01, recorded at Deed Book 30225, page 329 to provisions burdening the property as contained in

that first amendment to sewer and easement agreement and agreement concerning access easement agreement and cross easement agreement by and between Charles S. Ackerman, Regent Tower Holdings, Inc., a Georgia corporation, Tower Place, L.P., a Georgia limited partnership and Buckhead Hotel Associates, LLC, a Delaware limited liability company.

The following easements affect only the easements areas:

15. Rights of Richard B. Johnson et al. by virtue of the grant of easement, dated 11-26-73, filed 11-26-73 and recorded at Deed Book 5945, page 5, aforesaid records, as disclosed on that ALTA/ASCM land title survey for Regent Tower Holdings, Inc., Tower Place, L.P., Buckhead Hotel Associates, LLC, Teachers Insurance and Annuity Association of America, First Union National Bank, Chicago Title Insurance Company, and Nationwide Life Insurance Company, dated 3-5-99, last revised 9-16-99 prepared by Mayes, Sudderth & Etheredge, Inc., bearing the stamp and seal of Georgia T. White, RLS No. 1929.
16. Joinder to grant of easement, Peachtree-Piedmont Associates, Grantor and Agnes K. Dillon, Grantee, dated 11-26-73, filed 11-26-73 and recorded at Deed Book 5945, page 9, aforesaid records, as disclosed on that ALTA/ASCM land title survey for Regent Tower Holdings, Inc., Tower Place, L.P., Buckhead Hotel Associates, LLC, Teachers Insurance and Annuity Association of America, First Union National Bank, Chicago Title Insurance Company, and Nationwide Life Insurance Company, dated 3-5-99, last revised 9-16-99 prepared by Mayes, Sudderth & Etheredge, Inc., bearing the stamp and seal of Georgia T. White, RLS No. 1929.
17. Water meter easement from Peachtree-Piedmont Associates to the City of Atlanta, dated 7-3-74, filed 8-20-74 and recorded at Deed Book 6122, page 65, aforesaid records, as disclosed on that ALTA/ASCM land title survey for Regent Tower Holdings, Inc., Tower Place, L.P., Buckhead Hotel Associates, LLC, Teachers Insurance and Annuity Association of America, First Union National Bank, Chicago Title Insurance Company, and Nationwide Life Insurance Company, dated 3-5-99, last revised 9-16-99 prepared by Mayes, Sudderth & Etheredge, Inc., bearing the stamp and seal of Georgia T. White, RLS No. 1929.
18. Easement from Peachtree-Piedmont Associates to Allen B. Srochi, dated 10-22-74, filed 11-5-74 and recorded at Deed Book 6166, page 240, aforesaid records, as disclosed on that ALTA/ASCM land title survey for Regent Tower Holdings, Inc., Tower Place, L.P., Buckhead Hotel Associates, LLC, Teachers Insurance and Annuity Association of America, First Union National Bank, Chicago Title Insurance Company, and Nationwide Life Insurance Company, dated 3-5-99, last revised 9-16-99 prepared by Mayes, Sudderth & Etheredge, Inc., bearing the stamp and seal of Georgia T. White, RLS No. 1929.
19. Easement to install, operate, inspect and maintain storm drainage and inlet as contained in

that easement from Alan B. Srochi to Peachtree-Piedmont Associates, a Georgia limited partnership, dated 10-22-74, filed 11-5-74 and recorded at Deed Book 6167, page 1, aforesaid records, as disclosed on that ALTA/ASCM land title survey for Regent Tower Holdings, Inc., Tower Place, L.P., Buckhead Hotel Associates, LLC, Teachers Insurance and Annuity Association of America, First Union National Bank, Chicago Title Insurance Company, and Nationwide Life Insurance Company, dated 3-5-99, last revised 9-16-99 prepared by Mayes, Sudderth & Etheredge, Inc., bearing the stamp and seal of Georgia T. White, RLS No. 1929.

20. Right-of-way easement from H.E. Porter to Georgia Power Company, dated 6-16-56, filed 8-31-56 and recorded at Deed Book 3148, page 645, aforesaid records.

    Note: Georgia Power Company claims no further interest except the right to operate, maintain, rebuild and renew its existing facilities within its presently maintained right-of-way.

21. Permit for anchors, buy poles and wires from the Cotton Producers Association to Georgia Power Company, dated 6-16-60, filed 6-30-60 and recorded at Deed Book 3587, page 379, aforesaid records.

    Note: Georgia Power Company claims no further interest except the right to operate, maintain, rebuild and renew its existing facilities within its presently maintained right-of-way.

22. Right-of-way easement from the Cotton Producers Association to Georgia Power Company, dated 11-4-64, filed 12-3-64 and recorded at Deed Book 4338, page 171, aforesaid records.

    Note: Georgia Power Company claims no further interest except the right to operate, maintain, rebuild and renew its existing facilities within its presently maintained right-of-way.

23. Easement from Blue Cross and Blue Shield of Georgia/Atlanta, Inc. to Georgia Power Company, dated 9-29-77, filed 2-10-78 and recorded at Deed Book 6891, page 495, aforesaid records.

    Note: Georgia Power Company claims no further interest except the right to operate, maintain, rebuild and renew its existing facilities within its presently maintained right-of-way.

24. Declaration of easement by Capital City Plaza Associates, dated 12-23-86, filed 12-26-86 and recorded at Deed Book 10515, page 247, aforesaid records; as re-recorded 2-5-87 at Deed Book 10602, page 51, aforesaid records, as to the Blue Cross easement as defined therein, as disclosed on that ALTA/ASCM land title survey for Regent Tower Holdings, Inc., Tower Place, L.P., Buckhead Hotel Associates, LLC, Teachers Insurance and Annuity Association

of America, First Union National Bank, Chicago Title Insurance Company, and Nationwide Life Insurance Company, dated 3-5-99, last revised 9-16-99 prepared by Mayes, Sudderth & Etheredge, Inc., bearing the stamp and seal of Georgia T. White, RLS No. 1929.

Note: The company insures the insured that the appurtenant easement insured hereunder is a perpetual easement and that there are no conditions contained in said document which could result in the termination of said easement, as disclosed on that ALTA/ASCM land title survey for Regent Tower Holdings, Inc., Tower Place, L.P., Buckhead Hotel Associates, LLC, Teachers Insurance and Annuity Association of America, First Union National Bank, and Chicago Title Insurance Company, dated 3-5-99, last revised 9-16-99 prepared by Mayes, Sudderth & Etheredge, Inc., bearing the stamp and seal of Georgia T. White, RLS No. 1929.

25. Easement reserved in Quitclaim Deed with reservation of easement from the Department of Transportation of the State of Georgia to Charles S. Ackerman, dated 10-13-89, filed 10-16-89 and recorded at Deed Book 12861, page 302, aforesaid records, as disclosed on that ALTA/ASCM land title survey for Regent Tower Holdings, Inc., Tower Place, L.P., Buckhead Hotel Associates, LLC, Teachers Insurance and Annuity Association of America, First Union National Bank, Chicago Title Insurance Company, and Nationwide Life Insurance Company, dated 3-5-99, last revised 9-16-99 prepared by Mayes, Sudderth & Etheredge, Inc., bearing the stamp and seal of Georgia T. White, RLS No. 1929.
26. MARTA escape easement contained in that certain limited warranty deed from Capital City Plaza Associates, a general partnership to the Department of Transportation of the State of Georgia, dated 11-30-89, filed 11-30-89 and recorded at Deed Book 12995, page 190, aforesaid records, as disclosed on that ALTA/ASCM land title survey for Regent Tower Holdings, Inc., Tower Place, L.P., Buckhead Hotel Associates, LLC, Teachers Insurance and Annuity Association of America, First Union National Bank, Chicago Title Insurance Company, and Nationwide Life Insurance Company, dated 3-5-99, last revised 9-16-99 prepared by Mayes, Sudderth & Etheredge, Inc., bearing the stamp and seal of Georgia T. White, RLS No. 1929.
27. Conveyance and access rights by and between the Department of Transportation, State of Georgia and Capital City Plaza Associates, dated 9-22-88, filed 11-14-88 and recorded at Deed Book 12044, page 31, aforesaid records, as disclosed on that ALTA/ASCM land title survey for Regent Tower Holdings, Inc., Tower Place, L.P., Buckhead Hotel Associates, LLC, Teachers Insurance and Annuity Association of America, First Union National Bank, Chicago Title Insurance Company, and Nationwide Life Insurance Company, dated 3-5-99, last revised 9-16-99 prepared by Mayes, Sudderth & Etheredge, Inc., bearing the stamp and

seal of Georgia T. White, RLS No. 1929.

28. Dual exit driveway agreement by and between the Department of Transportation, State of Georgia and Capital City Plaza Associates, dated 9-22-88, filed 11-14-88 and recorded at Deed Book 12044, page 30, aforesaid records, as disclosed on that ALTA/ASCM land title survey for Regent Tower Holdings, Inc., Tower Place, L.P., Buckhead Hotel Associates, LLC, Teachers Insurance and Annuity Association of America, First Union National Bank, Chicago Title Insurance Company, and Nationwide Life Insurance Company, dated 3-5-99, last revised 9-16-99 prepared by Mayes, Sudderth & Etheredge, Inc., bearing the stamp and seal of Georgia T. White, RLS No. 1929.
29. Water system easement from Capital City Plaza Associates to the City of Atlanta, a municipal corporation of the State of Georgia, dated 2-11-88, filed 2-18-88 and recorded at Deed Book 11335, page 37, aforesaid records.
30. Cross easement agreement, dated 11-26-73, and filed 11-26-73 and recorded at Deed Book 5945, page 7, aforesaid records.
31. Indemnity agreement regarding real property by and between Regent Peachtree Holdings, Inc., a Georgia corporation, and Regent Partners, Inc., a Georgia Corporation and Blue Cross and Blue Shield of Georgia, Inc., a Georgia Corporation, dated 5-5-94, filed 5-6-94 and recorded at Deed Book 16232, page 331, aforesaid records.

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